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# D E C I S I O N
# of 7 June 2005

**Case Number:** T 0376/02 - 3.4.2

**Application Number:** 93310342.6

**Publication Number:** 0604179

**IPC:** G01M 11/02

**Language of the proceedings:** EN

**Title of invention:**
Ophthalmic lens inspection method and apparatus

**Patentee:**
JOHNSON & JOHNSON VISION PRODUCTS, INC.

**Opponent:**
Novartis AG

**Headword:**
-

**Relevant legal provisions:**
EPC Art. 52(1), 54, 56, 123(2)

**Keyword:**
"Novelty (main and first auxiliary request: yes) - specific combination of elements of the common general knowledge"
"Inventive step (main request: no; first auxiliary request: yes)"

**Decisions cited:**
-

**Catchword:**
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

**Case Number:** T 0376/02 - 3.4.2

# D E C I S I O N
**of the Technical Board of Appeal 3.4.2**
**of 7 June 2005**

**Appellant:** (Proprietor of the patent)
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**Representative:**
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**Decision under appeal:**
**Interlocutory decision of the Opposition Division of the European Patent Office posted 8 February 2002 concerning maintenance of European patent No. 0604179 in amended form.**

**Composition of the Board:**

**Chairman:** A. G. Klein
**Members:** F. J. Narganes-Quijano
M. J. Vogel

## Summary of Facts and Submissions

I. Both the patent proprietor and the opponent have appealed against the interlocutory decision of the opposition division finding European patent No. 0604179 (based on European patent application No. 93310342.6) as amended according to an auxiliary request to meet the requirements of the EPC.

II. The opposition filed by the opponent against the patent as a whole was based on the grounds of lack of novelty and lack of inventive step (Article 100(a) together with Articles 52(1), 54 and 56 EPC).

In its decision the opposition division held in particular that independent claims 1 and 22 according to the patent proprietor's main request directed to the patent as granted did not define new subject-matter with regard to the disclosure of document

D1: EP-A-0491663,

and that the sole independent claim 1 amended according to the first auxiliary request then on file defined patentable subject-matter.

III. During the appeal proceedings the parties have referred to document D1 and to the following documents already considered during the first-instance proceedings:

D13: US-A-4691231,

D14: "Digitale Bildverarbeitung - Grundlagen und Anwendungen", P. Haberäcker, 4th ed., 1991, Hanser

Studienbücher, Carl Hanser Verlag, DE; pages 7 to 13, 27 to 35, 41 and 42, 54 and 55, 235 to 237, 331 to 339, 349 to 355, and 362 to 365, and

D19: "Brockhaus - Naturwissenschaft und Technik", Vol. 1, F. A. Brockhaus Mannheim, DE, 1989; pages 193 and 194.

The opponent has also referred for the first time during the appeal proceedings to the following documents as illustrating common general knowledge:

D15: "Industrielle Bildverarbeitung", R.-J. Ahlers *et al.*, Addison-Wesley GmbH, DE, 1991; pages 15, 20, 97 to 100, 116, 118, and 201 to 203,

D16: "Digitale Bildverarbeitung", B. Jähne, Springer Verlag, DE, 1989; pages 38, 39 and 300 to 315,

D17: "Advances in digital image processing", P. Stucki, Plenum Press, U.S., 1979; pages 26 and 27, 77 and 78, 81 to 99, and 249 to 263, and

D18: "Automated Visual Inspection", B. G. Batchelor *et al.*, IFS Ltd, UK, 1985; pages 459 and 460.

IV. Oral proceedings were held before the Board on 28 April 2005 in the presence of the parties.

The patent proprietor requested setting aside of the decision and the maintenance of the patent as granted as a main request or the maintenance of the patent in amended form on the basis of claims 1 and 22 as amended according to the first to third auxiliary requests

filed with the letter dated 24.03.2005 together with claims 2 to 21, the description and the drawing sheets of the patent as granted.

The opponent requested setting aside of the decision and the revocation of the patent.

At the end of the oral proceedings the Chairman declared the debate closed and announced that the decision would follow in writing.

V. Claims 1 and 22 according to the main request read as follows:

"1. A method of inspecting an ophthalmic lens comprising the steps of:

forming an illuminated image of the lens on an array of pixels;

generating data values representing the intensity of the illuminated image on said array of pixels; and

assigning to each of the pixels a position value, and an image intensity value representing the intensity of the lens image on the pixel;

characterized by the steps of:

using a computer to:

(i) compare the position values and the image intensity values of the pixels to establish relationships among the pixels,

(ii) from said relationships, identify sets of pixels in illuminated images of predetermined features of the lens, and

(iii) compare relationships among pixels in the identified sets of pixels to a pre-

established relationship to ascertain if a lens is acceptable."

"22. An apparatus for the inspection and evaluation of ophthalmic lenses, comprising:

a light source (14) for illuminating a lens (12);

a camera (16) comprising a receptor (20) including a plurality of pixels for receiving an illuminated image of the lens (12); and

means (26, 28, 30) for generating data values representing the intensity of the illuminated image on each of the pixels; characterised by

memory means (46) for storing the image intensity value associated with each pixel, and for storing a location value associated with the location of each of the pixels in the receptor; and

a digitized computer (28) connected to the memory means (46) for receiving the image intensity values and the location values therefrom, and including means for comparing the image intensity values and the location values among the pixels, and further including means to determine whether said features make the lens unacceptable."

Claims 2 to 21 are dependent claims all referring back to claim 1.

Claims 1 to 21 according to the first auxiliary request are identical to claims 1 to 21 of the main request and the wording of claim 22 amended according to the first auxiliary request results from that of claim 22 of the main request after the replacement of the text of the last paragraph of the claim by the following text:

"a digitized computer (28) connected to the memory means (46) for receiving the image intensity values and the location values therefrom, and including means for comparing the image intensity values and the location values to establish relationships among the pixels, for identifying, from said relationships, sets of pixels in illuminated images of predetermined features of the lens, and further including means for comparing relationships among pixels in the identified sets of pixels to a pre-established relationship to determine whether said features make the lens unacceptable."

The wording of the claims amended according to the second and third auxiliary requests is not relevant to the present decision.

VI. The arguments of the patent proprietor in support of its requests are essentially the following:

The decision of the opposition division is based on a construction of the claims that does not maintain the clear distinction between the various image processing steps defined in the claims, and in particular the distinction between the establishment of relationships among the pixels and the subsequent identification of sets of pixels from said relationships. The invention involves a comparison of the intensity values of the pixels to establish relationships the pixels bear to each other - such as intensity gradients - and then these relationships are used to identify sets of pixels. The determination of the severity of the defects and thus the acceptability of the lens is then based on a comparison of relationships among the pixels in the identified sets of pixels to a pre-established

relationship. These processing steps are clearly defined in the claims and in addition are supported by the embodiments described in the patent specification.

Document D1 processes a high-contrast image obtained by dark-field illumination and in which each pixel is either bright or dark, the processing merely consisting in detecting and counting the bright pixels without however comparing the pixels with each other. In addition, in the invention and in particular in the apparatus of claim 22 as granted the intensities of the pixels have different grey scale values, and the location and the intensity values of the pixels are compared with each other for determining whether or not the lens is acceptable. Thus, contrary to document D1, the invention is based on grey scale intensity values which require the use of hell-field illumination. Furthermore, no comparison of the positions or the image intensities of the pixels is required in document D1, the document merely describing counting the number of bright pixels falling within predetermined zones of the lens and therefore involving at the most a comparison of the pixel intensity with a reference value.

In addition, in document D1 the edge of the lens is imaged as a bright ring (Figure 5) and there is no need to use image processing analysis to detect the features of the edge itself. The lens edge is rather detected by the operator without reference to the image pixels for manually centring and precisely positioning the lens. As to the analysis of the edge itself, this operation involves in document D1 the comparison of features of

the edge with default thresholds but the document fails to describe any methodology for this analysis.

Even supposing that each individual image processing step of the invention belongs to the common general knowledge in the field of image processing, it was neither known nor obvious to combine them and to apply the resulting combination to the inspection of lenses for the evaluation of defects.

Thus, the prior art does not involve, among others, the establishment of relationships among the pixels to identify particular sets of pixels on which the further pixel data processing as claimed is then to be based. The invention results in an automated method of detecting defects in lenses, the outcome of which closely reproduces that which is obtained by human inspection.

VII. The arguments of the opponent in support of its request can be summarized as follows:

The invention pertains to a complex system covering multidisciplinary technical fields such as illumination and imaging, image processing and evaluation, etc. and the skilled person to be considered consists in fact of a team of skilled persons working in the respective fields and in the field of application of the system (document D15, pages 15 and 201 to 203, and document D18, pages 459 and 460), i.e. in the field of inspection of ophthalmic lenses. In addition, image processing is a standard technique used in the automatic inspection of a great variety of objects including ophthalmic lenses.

Document D1 operates with a contrast image obtained by a specific illumination technique that is not excluded by the invention. In addition, a CCD image sensor as that disclosed in document D1 delivers for each pixel an electrical signal that is a function of the light incident on the pixel and the CCD does not deliver binary values but grey level values (document D13, column 2, lines 65 to 67, document D19, entry "CCD" on pages 193 and 194, and document D14, section 5.2.1). Document D1 also describes conversion into digital image signals and the preferred use of binary values (page 3, lines 1 to 5), but the document does not properly impose any restriction to the number of grey scale values of the image signals. In any case, the formulation of the claims according to the main and the first auxiliary requests does not exclude the use of binary image values. In addition, the identification of edges in the image of an object by means of gradients, histograms or neighbouring relationships constitutes a common procedure in image processing as illustrated by document D14 which discloses image processing based on image segmentation of a grey-level image for the purpose of identifying edges in the image (Figures 16.1 and 16.4, pages 331 to 336 and 349 and 350) and teaches towards the processing of grey-level images as opposed to binary-level images (pages 55 and 236). Document D1 itself discloses an analysis of the edge of the lens for the identification of the lens edge and for the determination of edge defects (page 5, lines 15 to 26). The comparison of relationships among predetermined pixels to pre-established relationships constitutes a standard and well-known procedure in image processing as shown in document D15, page 20 and is also disclosed

in document D1 (page 5, lines 17 to 23 and 31 to 38) where the perimeter of the lens is compared to threshold values for determining deviations of the lens perimeter from a circular shape.

The general common knowledge of the team of skilled persons alone also anticipates or at least renders obvious the invention. Thus, as discussed in document D15 (pages 116 and 118), different illumination techniques can be used depending on the image features to be processed. In addition, the features of the invention relating to the detection of pixel intensity values are inherent to CCD imaging (document D19, entry "CCD" on pages 193 and 194, and document D16, page 38). As to the claimed features relating to the processing of the pixel intensity values, these features constitute standard image processing steps well known in the art as illustrated by the disclosure of document D14 relating to the comparison of the position and the intensity values of the pixels in order to determine on the basis of histogram-based relationships pixel regions having predetermined characteristics for the purpose of identifying the edge of an object (document D14, pages 235 and 331 ff.). Image processing by image segmentation and by the establishment of relationships - such as histograms - among the image segments in order to identify segment regions also constitutes a standard technique as shown in documents D14 (page 27), D15 (pages 97 to 100), D16 (pages 38 and 39) and D17, document D16 also disclosing the features and the components of a computer used in image processing (Annex B of document D16). In addition, as already mentioned with reference to document D15, the claimed step relating to the comparison of relationships within

the sets of pixels to pre-established relationships also corresponds with a standard image processing procedure used in quality control. The application of these techniques to the inspection of lenses also falls within the common knowledge of the team of skilled persons.

## Reasons for the Decision

1. The appeals filed by the patent proprietor and the opponent are both admissible.

2. *Main request - claim 22 as granted*

2.1 Document D1 discloses a method of inspecting and evaluating ophthalmic lenses and an apparatus for carrying out the method (abstract and page 2, lines 36 to 47). The lens is illuminated with a light source 18 by dark-field illumination and a high-contrast image of the illuminated lens is captured by a CCD camera 4 which generates data values representing the intensity of the image on each of the pixels of the pixel array of the CCD camera; the data values are then converted into binary data and stored (Figures 1 and 2 together with page 2, line 52 to page 3, line 18, and page 4, lines 14 to 36 and 42 to 44). Defects in the lens are imaged as bright areas and the number of bright pixels in the image areas provides a measure of the extent of the defects (Figure 2 and page 3, lines 10 to 21). An electronic image processing and analysing device is used for processing and analysing the stored image data by counting the number of bright pixels in the image areas and by comparing the number of bright pixels with

a threshold value associated with one of a number of predetermined optical zones of the lens in which the image areas are located (page 3, lines 21 to 29, page 4, lines 37 to 41, and page 5, lines 3 to 14 and 27 to 36). Depending on the results of this comparison, the lens is judged to be acceptable or not (page 5, lines 33 to 44).

The document discloses in addition a lens edge analysis procedure in which the edge profile of the lens is first detected for centring and positioning of the lens (page 4, lines 44 to 50) and parameters of the lens edge profile such as the radius and the circular shape are determined and then processed according to predetermined criteria for determining defects of the lens edge (Figures 5 and 6 and page 5, lines 15 to 26).

2.2 It follows from the above that the memory means of the lens inspection and evaluation apparatus disclosed in document D1 stores the binary image and therefore stores intensity data and location data for each of the pixels of the CCD image receptor (Figure 2 and page 4, lines 42 to 44) and that the apparatus also includes means for comparing the intensity and location data among the pixels of the binary image (page 4, line 37 and page 5, lines 27 to 33). However, document D1 does not specify the structure of the electronic image processing and analysing device and the disclosure of the document accordingly does not allow unambiguously the conclusion that this device is constituted by a digitized computer. Thus, document D1 anticipates all the features of the apparatus defined in claim 22 of the patent as granted, with the exception of the use of a digitized computer.

The patent proprietor has submitted that in claim 22 the image of the lens captured by the CCD camera is an illuminated image and not a high-contrast image of the lens obtained by dark-field illumination as it is the case in document D1 and that, in addition, claim 22 requires a comparison of the location and the intensity values among the pixels and therefore defines a processing step based on grey scale intensity values and not on binary intensity values as in document D1. However, as argued by the opponent, the references in claim 22 to a light source for illuminating the lens and to an illuminated image of the lens being received by the camera receptor do not exclude illuminating the lens by means of a dark-field illumination system as that considered in document D1 or the formation of the illuminated image of the lens as a high-contrast image of the lens. In addition, the apparatus of document D1 includes means for counting bright pixels located in predetermined zones of the image of the lens and for comparing the results with a threshold value associated with the respective lens zone; consequently, these means determine on the basis of the intensity and the position of the pixels the number of pixels located in predetermined zones of the image and having predetermined intensity values and, since claim 22 does not specify the nature of the comparison, these means carry out intrinsically a comparison of the image intensity values and the location values among the pixels within the meaning of claim 22. Finally, contrary to the submissions of the patent proprietor, none of the features of the apparatus of claim 22 is explicitly or implicitly restricted to grey level image intensities of the pixels and - as also argued by the

opponent - the claim does not exclude the processing of pixel image intensities having only two values, i.e. dark or bright intensities as it is the case in document D1. Thus, in view of the general formulation of claim 22, the arguments of the patent proprietor fail to persuade the Board.

The further submissions of the patent proprietor relating to the establishment and the comparison of relationships as constituting further distinguishing features are not persuasive either because claim 22 of the main request is silent as to such features.

2.3 It follows that the sole distinguishing feature of the apparatus of claim 22 over the disclosure of document D1 is the implementation of the electronic image processing and analysing device in the form of a digitized computer. At the priority date of the patent in suit, however, it was a standard procedure to implement such type of devices in the form of a digitized computer and in the Board's view the use of a digitized computer for carrying out the image processing and analysing operations disclosed in document D1 constitutes a trivial and straightforward implementation of the disclosure of document D1.

Consequently, the subject-matter of claim 22 according to the main request of the patent proprietor does not involve an inventive step (Articles 52(1) and 56 EPC).

3. *First auxiliary request*

3.1 *Amendments*

Claims 1 to 21 of the first auxiliary request are identical to claims 1 to 21 of the patent as granted. As regards claim 22 amended according to the first auxiliary request, this claim results from claim 22 of the patent as granted with the additional features specifying that the image intensity values and the location values are compared "to establish relationships" among the pixels "for identifying, from said relationships, sets of pixels in illuminated images of predetermined features of the lens" and that the means to determine whether the features make the lens unacceptable are "for comparing relationships among the pixels in the identified sets of pixels to a pre-established relationship". These amendments were carried out in order to bring the functional features of the apparatus of claim 22 in line with the features defined in the characterizing portion of method claim 1 of the patent as granted.

After due consideration of the amendments made to claim 22, the Board is satisfied that they comply with the requirements of Articles 123(2) and (3) EPC. This view was not contested by the opponent during the appeal proceedings.

3.2 *Claim 22 - Novelty*

The additional features referred to in point 3.1 above and incorporated into the subject-matter of claim 22 constitute, together with the use of a digitized

computer as image processing and analysing device (point 2.2 above), the distinguishing features of the claimed subject-matter over the disclosure of document D1. In particular, although as concluded in point 2.2 above document D1 intrinsically involves a comparison of the image intensity and the location values of the pixels, this comparison is only made on the basis of the number of bright pixels within a predetermined zone of the image of the lens and with reference to a threshold value associated with that zone (page 3, lines 19 to 24 and page 5, lines 27 to 33). Thus, the comparison in document D1 does not result in the establishment of relationships among the pixels themselves as claimed, still less in the identification of sets of pixels from the established relationships and in the subsequent comparison of relationships among pixels in the identified sets of pixels to a pre-established relationship as defined in the amended claim.

Document D1 also discloses an analysis of the edge of the lens (second paragraph of point 2.1 above) which involves the comparison of features of the edge of the lens to pre-established features (page 5, lines 15 to 26). However, this evaluation of the lens edge is disclosed in document D1 as an additional procedure different from the image processing of the pixels of the lens image referred to above. In addition, as submitted by the patent proprietor, the document fails to specify whether the lens edge analysis is also carried out on the basis of a processing of the pixels of the image of the lens edge - for instance in terms of a comparison of the position and the intensity values of the pixels - or only on the basis of the

shape of the image of the lens edge as viewed for instance by the operator. Thus, the lens edge analysis disclosed in document D1 does not affect the conclusion above that the features of the image pixel data processing defined in claim 22 of the first auxiliary request are not anticipated by the disclosure of document D1.

As to the references made by the opponent to the common general knowledge illustrated by a number of books and manuals (documents D14 to D19), the Board notes that, even assuming that each of the different features of the apparatus of claim 22 taken separately might well have been known or might have constituted common general knowledge of the skilled person at the priority date of the patent, none of the documents cited by the opponent discloses the specific combination of features defined in the amended claim 22. In addition, the combination of a plurality of features that interact with each other and each of which allegedly belongs to the common general knowledge does not itself necessarily belongs, in the absence of evidence to the contrary, to the common general knowledge and the submissions of the opponent in this respect go beyond the assessment of novelty under Article 54 EPC.

3.3 *Claim 22 - Inventive step*

In view of the primary problem that the invention intends to solve, i.e. the automated inspection of ophthalmic lenses, document D1 constitutes the closest state of the art. The submission of the opponent that the common general knowledge of the skilled person as illustrated in documents D14 to D19 also qualifies as

closest state of the art cannot be followed as none of these documents even mentions the automated inspection of lenses as one of the objects of the corresponding disclosure.

The use of a digitized computer constitutes a distinguishing feature of the apparatus of claim 22 over the disclosure of document D1. This feature, however, is technically unrelated to the remaining distinguishing features identified in point 3.2 above and does not contribute to inventive step for reasons analogous to those pointed out in point 2.3 above with regard to claim 22 of the main request.

As regards the remaining distinguishing features identified in point 3.2 above, these features improve the apparatus disclosed in document D1 and based on the mere determination of pixels having predetermined characteristics in that the automated inspection of lenses to check whether they meet pre-established criteria is made more accurate (page 2, lines 36 to 38, page 13, lines 1 to 5, and page 18, lines 24 to 26 of the patent) by virtue of the comparison to a pre-established relationship of relationships among pixels in specific sets of pixels previously identified on the basis of the position and the intensity of the pixels.

Accordingly, the technical problem solved by the subject-matter of claim 22 over the disclosure of document D1 can be seen in the improvement of the accuracy in the automated inspection of ophthalmic lenses.

None of the documents referred to by the opponent during the appeal proceedings mentions this technical problem. In particular, document D13 is directed to the inspection of bottles and the like (abstract and column 1, lines 7 to 14) and documents D14 to D19 disclose in detail different image processing techniques but none of them pertains to the automated inspection of lenses.

In addition, a skilled person - or, as submitted by the opponent, a team of skilled persons - confronted with the problem formulated above would not find in the disclosures of documents D13 to D19 any hint to the specific problem to be solved or to the particular combination of features as claimed. In particular:

The bottle inspection apparatus of document D13 processes video views of the bottles taken by a plurality of cameras (column 2, lines 42 to 67). The image pixel data includes grey level intensity information (column 2, lines 65 to 67) and the image pixel data within predetermined zones of the bottles is processed to detect diffuseness that may indicate scuffing (column 8, lines 51 to 68), whereby the detection is based on the number of pixels having predetermined intensities values (Figures 4 an 5 together with column 9, lines 1 to 8, and column 10, line 1 to column 11, line 44). Thus, as far as the claimed subject-matter is concerned, the teaching of document D13 does not go beyond that of document D1.

Document D14 is a book on digital image processing. The document mentions the use of image processing in quality control of work pieces (page 236) and discloses,

among other procedures, the use of histograms representing the relative frequency of grey values for the characterization of the distribution of grey level values in an image (page 27 ff.), the use of gradients in the determination of grey level value edges in an image (pages 331 ff.) and the use of image segmentation (page 235 ff.) and sequential edge extraction and line tracing (page 349 ff.) in image processing. However, although some of these image processing techniques may separately be brought into correspondence with some of the functional features of the different means defined in claim 22, the opponent has failed to identify a teaching in document D14 that would hint at the particular combination of features according to the claimed subject-matter.

Documents D15 and D16 are two manuals on digital image processing. Pages 97 to 100 of document D15 disclose operations based on the relationships between neighbouring pixels in a pixel matrix and pages 38 and 39 of document D16 discloses the identification of objects according to changes in the grey level intensity between neighbouring pixels. These teachings may hint towards the comparison of the position and the intensity of the pixels for establishing relationships between the pixels and for identifying sets of pixels, but not towards the subsequent comparison of relationships between pixels in the identified sets of pixels to a pre-established relationship as required by the claimed subject-matter. In particular, page 20 of document D15 mentions the determination of whether an object is acceptable or not depending on whether the processed image of the object exhibits pre-determined characteristics and, as contrarily submitted by the

opponent, no hint can be found in the corresponding disclosure towards the comparison to a pre-established relationship of relationships among image pixels of a set of pixels previously determined on the basis of the pixels themselves.

Document D17 pertains to digital image processing and no section of the document has been identified by the opponent as disclosing the processing of image pixel data.

Document D18 pertains to automated visual inspection but is silent as to image processing itself.

Finally, document D19 only reports on CCD camera imaging and is silent as to the inspection of objects.

Thus, although the documents cited by the opponent disclose different image processing procedures, none of the documents discloses or suggests the particular combination of processing features of the image pixel data as defined in claim 22. For these reasons, the subject-matter of claim 22 of the first auxiliary request involves an inventive step within the meaning of Article 56 EPC with regard to the documents considered by the parties during the appeal proceedings and the common general knowledge of the skilled person alleged by the opponent.

3.4 *Claims 1 to 21 - Novelty and inventive step*

Claim 1 of the first auxiliary request is directed to a method of inspecting an ophthalmic lens and the steps of the method are essentially in one-to-one

correspondence with the functional features of the different means constituting the apparatus defined in claim 22 of the first auxiliary request. Consequently, the subject-matter of claim 1 is novel and involves an inventive step for reasons analogous to those set forth in points 3.2 and 3.3 above with regard to claim 22 of the first auxiliary request (Articles 52(1), 54 and 56 EPC).

The same conclusion applies to claims 2 to 21 by virtue of the dependence of these claims on claim 1.

4. The Board is therefore satisfied that the patent as amended according to the first auxiliary request and the invention to which it relates meet the requirements of the EPC. Accordingly, the contested decision is to be set aside and the patent maintained in amended form on the basis of the patent documents according to the first auxiliary request of the patent proprietor (Article 102(3) EPC).

## 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 maintain the patent in amended form on the basis of the following documents:

   - claims: claims 1 and 22 according to the first auxiliary request filed by the patent proprietor with the letter dated 24.03.2005 and claims 2 to 21 according to the patent as granted,

   - description: pages 2 to 18 of the patent as granted, and

   - drawings: Figures 1 to 17a and 17b of the patent as granted.

The Registrar: The Chairman:

P. Martorana A. G. Klein