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D E C I S I O N
of 19 March 2003

Case Number: T 0686/01 - 3.4.2

Application Number: 93310341.8

Publication Number: 0605990

IPC: G01M 11/02

Language of the proceedings: EN

Title of invention:

Illumination and imaging subsystems for a lens inspection system

Patentee:

JOHNSON & JOHNSON VISION PRODUCTS, INC.

Opponent:

Novartis AG

Headword:

-

Relevant legal provisions:

EPC Art. 56, 84, 123(2)
EPC R. 57(1)

Keyword:

"Inventive step (first auxiliary request: yes)"
"Admissibility of new request filed at the oral proceedings
(yes, legitimate reaction to an objection raised by the other
party, not introducing any new issues of substance)"

Decisions cited:

T 0119/82

Catchword:

-



Case Number: T 0686/01 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 19 March 2003

Appellant: JOHNSON & JOHNSON VISION PRODUCTS, INC.
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 20 April 2001
revoking European patent No. 0 605 990 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: E. Turrini
Members: A. G. Klein
G. E. Weiss

Summary of Facts and Submissions

I. European patent No. 0 605 990 (application No. 93 310 341.8) was revoked by the Opposition Division on the ground that the subject-matter of claim 1 as granted did not involve an inventive step within the meaning of Article 56 EPC in view of the contents of the following documents:

D1: EP-A-0 491 663;

D2: Bergmann, Schäfer: "Optik", Walter de Gruyter Verlag, 8th edition 1987, pages 438 to 452.

The Opposition Division considered that the claimed lens inspection system differed from the prior art arrangement disclosed in document D1 only by the use of an alternative dark-field illumination technique, which was known from document D2, and by the obvious replacement of the prior art continuous light source by a pulsed source, there being no apparent reason for not implementing such pulsed light source in the apparatus of document D1.

II. The appellant (proprietor of the patent) lodged an appeal against the Opposition Division's decision revoking the patent.

III. Oral proceedings were held on 19 March 2003, at which the appellant as its main request requested that the decision under appeal be set aside and that the patent be maintained as granted.

Claim 1 of the patent as granted reads as follows:

"1. A lens inspection system (10) for inspecting ophthalmic lenses (114), comprising:

means (110) for holding an ophthalmic lens (114);

lighting means (30) for generating light pulses (82);

signal generating means (46) to generate a set of signals representing the intensity of light incident thereon;

means (32,34,120,122) for directing the light pulses (82) through the lens holding means (110) and onto said signal generating means (46) to produce thereon a light pattern representing the ophthalmic lens (114) held in the holding means (110); and

processing means (14) connected to the signal generating means (46) to receive said set of signals therefrom, and to process said signals according to a predetermined program to generate an output signal representing at least one condition of the lens (114);

characterised in that the directing means comprises:

a stop (40) axially disposed between the lens holding means (110) and the signal generating means (46); and

means (120,122) for directing portions of the light pulses (82) scattered by the ophthalmic lens

(114) past the stop (40) and onto the signal generating means (46) so as to image thereon selected portions of the ophthalmic lens (114)."

As a first auxiliary request, the appellant requested that the patent be maintained with a set of claims presented at the oral proceedings, of which claim 1, the only independent claim, reads as follows:

"A lens inspection system (10) for inspecting ophthalmic lenses (114), comprising:

a transport subsystem (12), including means (110) for holding an ophthalmic lens (114), for continuously moving a multitude of said ophthalmic lenses along a predetermined path to move each of those lenses, one at a time, into a lens inspection position (144);

lighting means (30) for generating light pulses (82);

signal generating means (46) to generate a set of signals representing the intensity of light incident thereon;

means (32, 34, 120, 122) for directing a light pulse (82) through each lens holding means (110) as it moves continuously through the lens inspecting position (144), and onto said signal generating means (46) to produce thereon a light pattern representing the ophthalmic lens (114) held in the holding means (110); and

processing means (14) connected to the signal generating means (46) to receive said set of signals therefrom, and to process said signals according to a

predetermined program to generate an output signal representing at least one condition of the lens (114);

wherein the directing means comprises:

a stop (40) axially disposed between the lens holding means (110) and the signal generating means (46); and

means (120, 122) for directing portions of the light pulses (82) scattered by the ophthalmic lens (114) past the stop (40), as each ophthalmic lens (114) moves continuously through the inspection position (144) and onto the signal generating means (46) so as to image thereon selected portions of the ophthalmic lens (114)."

As a second auxiliary request, the appellant requested that the patent be maintained with an alternative set of claims comprising further limitations.

The respondent (opponent) requested that the appeal be dismissed (main request) or in the alternative that the case be remitted to the first instance for further prosecution on the basis of the appellant's auxiliary requests and that the costs be apportioned.

The Board announced its decision at the end of the oral proceedings.

IV. The appellant's submissions in support of its requests can be summarised as follows.

Although the Opposition Division correctly identified the features which distinguish the claimed subject-matter from the closest prior art lens inspection

system disclosed in document D1, it failed to properly apply the "problem-solution approach", using hindsight knowledge to determine what the skilled person could have done instead of demonstrating that he would inevitably have envisaged the claimed arrangement.

The Opposition Division did not either take into due account the unexpected combination effect resulting from the use of light pulses with an optical stop disposed between the lens and the image plane in terms of an increased positional tolerance of an inspected lens as it continuously moves past the inspection position, as evidenced by the declaration of Mr R. Fischer attached to the statement of the grounds of appeal dated 29 August 2001.

The inspection system of document D1 does not allow for inspection of continuously moving lenses. Each lens must be thoroughly centred relatively to the optical axis of the imaging camera. Such centring requires continuous illumination and using instead light pulses would substantially slow down the centring process and cause increased wear of the light bulbs as a result of the numerous pulses required for obtaining a single image.

Concerning the feature of an optical stop disposed between the lens and the image plane such that portions of the light pulses scattered by the ophthalmic lens are directed past the stop onto the imaging means, there is no obvious hint for the skilled person to depart from the very different optical arrangement recommended in document D1 for producing the dark-field images. Such optical stop arrangement is disclosed in document D2 in conjunction with Figure 3.95 only as an

option amongst several other, like detection in a direction orthogonal to the illumination axis (see Figure 3.90), illumination through a ring aperture (see Figure 3.91) and a reflector arrangement similar to the one actually used in document D1 (see Figure 3.92). Moreover, the stop arrangement of Figure 3.95 is disclosed there only in conjunction with the observation of large defects *in mica*, which is quite different from observing microscopic defects in transparent ophthalmical lenses. The skilled person therefore had no obvious reason to proceed to the substantial modification of the arrangement of document D1 which the implementation therein of the optical arrangement of Figure 3.95 of document D2 would require.

- V. The respondent in respect of the patentability of the subject-matter of claim 1 as granted submitted that the claim did not exclude the presence of a centring station as disclosed in document D1, and that it was not limited to the inspection of continuously moving lenses, accordingly.

The respondent also contested the conclusions in Mr R. Fischer's declaration, whose independent position relatively to the appellant's company was not demonstrated, in respect of the alleged increased positional tolerance of the lenses. The arrangement disclosed in the patent in suit could not dispense either with complicated measures to warrant proper positioning, such as the provision of different, precisely defined delays for the opening of the shutter of the camera and for the firing of the light pulses after occurrence of the trigger signal (see column 13, line 25 to column 14, line 15 of the patent

specification).

The respondent also referred *inter alia* to the following additional document:

D13: Brockhaus - Naturwissenschaften und Technik, 4th edition, 1989, pages 262 to 263,

to show that using the specific dark-field technique actually set out in claim 1 for the control of lenses and glasses belonged to the general knowledge of a skilled person at the priority date of the patent.

In respect of the appellant's first auxiliary request, based on a version of claim 1 submitted during the oral proceedings of 19 March 2003, the respondent submitted that it had been filed late and that it introduced features which had not been searched so far. The case should therefore be remitted to the first instance for further prosecution and the costs be apportioned in its favour.

The introduction into claim 1 of a generic reference to "a transport subsystem" in the respondent's view also offended against the provisions of Article 123(2) EPC, because such transport subsystem was disclosed originally only in conjunction with a specific centring table as shown in Figure 4 (see column 7, lines 4 to 17 of the patent specification) and it rendered the scope of the claim unclear within the meaning of Article 84 EPC because a "transport subsystem" cannot be considered to form part of the "lens inspection system" referred to at the beginning of the claim.

Concerning inventive step, the respondent submitted

that the transport subsystem described in the patent in suit in conjunction with Figure 4 allowed for movement of the lenses along orthogonal directions, and so did the X-Y table of the prior art construction disclosed in document D1. Only stepwise or continuous transportation being possible, selection of the latter transportation mode cannot be considered to involve an inventive step.

Reasons for the Decision

1. The appeal is admissible.
2. *Claim 1 of the appellant's main request*
 - 2.1 The Board concurs with the Opposition Division's view not disputed by the parties, that the lens inspection system of document D1 constitutes the closest prior art and that the subject-matter of claim 1 as granted is distinguished therefrom in substance by the two following features:
 - (i) the dark-field illumination technique of the construction of document D1, which uses oblique incident light rays, is replaced by a dark-field illumination technique using a stop axially disposed between the lens holding means and the signal generating means such that the signal generating means only receives light rays scattered by defects in the ophthalmic lens past the stop; and
 - (ii) the lighting means generates light pulses instead of the known continuous illumination.

2.2 Document D2, which illustrates general knowledge at the priority date of the patent in the field of optics, discloses the arrangement of feature (i) as a means of imaging local perturbations of the transmission of light through transparent objects according to the Schlieren method of A. Toepler (see Figure 3.95 on page 451). This technique is explained after several other dark-field illuminations techniques (see Figures 3.90 to 3.92 on pages 446 and 447), of which the technique of Figure 3.92 is very similar to the one used in the lens inspection system of document D1.

Document D13 which also illustrates general knowledge and refers to the above Schlieren method of A. Toepler states that optical Schlieren methods are used for the controlling of lenses and glasses (see the paragraph "Schlierenverfahren" on page 263).

The Board is therefore convinced that the mere substitution of the particular dark-field illumination means of the lens inspection system of document D1 by the Schlieren imaging arrangement as set out in feature (i), which not only was known from document D2 to be an alternative to the former dark-field illumination arrangement but was known also to be suitable for the same purpose of controlling lenses (see D13), cannot alone justify inventive step.

2.3 The Board concurs with the appellant's view that replacing the continuous light source of the device of document D1 by a pulsed source as set out in feature (ii) would not make much technical sense in the context of the lens inspection of document D1, since it would considerably slow down the lens alignment process required there and unnecessarily increase the

complexity and wear of the light source.

However, according to established case law of the Boards of Appeal, a disadvantageous modification of the prior art does not involve an inventive step if, like in the present case, the skilled person could clearly predict the resulting disadvantages, if his prediction was correct and if the predicted disadvantages were not compensated for by any unexpected technical advantage (see e.g. T 119/82 OJ EPO 1984, 217, point 16 of the reasons).

In respect of the technical effect achieved by features (i) and (ii) the appellant, on the basis of a declaration by Mr R. Fischer, submitted that there was a functional relationship between these two features.

The relationship in the appellant's view derived from the fact that the apparatus of the opposed patent was contemplated for use in the automated inspection of an array of ophthalmic lenses that were moving continuously through a lens inspection position. The pulsed lighting means of feature (ii) was required in order to capture the images of continuously moving lenses. Relatedly, the location of the stop between the lens holding means and signal generating means, as in feature (i), provided positional tolerance for the lenses as they moved through the point of inspection. By locating the stop behind the ophthalmic lens, one obtained leeway as to where in the light path the lens could be when the light pulse went off for inspection to begin. Positional tolerance was a consideration of special importance when the lenses were continuously moving because, unlike in a stationary inspection system, one could not centre each lens individually.

This line of argumentation could not convince the Board, because claim 1 actually lacks any feature which could limit its scope to the inspection of continuously moving lenses. As a consequence of the absence of any functional interrelation between features (i) and (ii), their contribution to inventive step shall be assessed separately.

Accordingly, for the above reasons, the subject-matter of claim 1 of the appellant's main request does not involve an inventive step within the meaning of Article 56 EPC.

3. *Claim 1 of the appellant's first auxiliary request*

3.1 Admissibility of the request into the procedure

The respondent contested the admissibility of the appellant's first auxiliary request into the procedure on the ground that it was filed only at the oral proceedings of 19 March 2003 and that it gave rise to new issues which the respondent had no opportunity to address properly, in relation in particular to the new feature of a transport subsystem.

The appellant's first auxiliary request is distinguished from the version of the first auxiliary request presented with the appellant's statement of grounds of appeal filed 29 August 2001 essentially in that the reference made there in claim 1 to an array of lenses moving continuously through a lens inspection position is now replaced by the definition of a transport subsystem for continuously moving a multitude of lenses along a predetermined path to move each of those lenses, one at a time, into lens inspection

position.

In the Board's view, this new formulation is to be considered as a legitimate attempt to overcome the objections raised by the respondent in its letter of 16 April 2002 against the definition in the earlier claim 1 of an array of lenses, on the ground that this definition would also cover an embodiment where several lenses could be inspected in parallel, such embodiment not having been originally disclosed. The respondent cannot therefore have been surprised by the introduction of the limitation relating to the lenses being moved one at a time into the lens inspection position, which it had itself required.

In addition, the mention of a "transport subsystem" cannot in the absence of any further details, be considered to introduce any specific further structural limitation to the subject-matter of the claim. Since claim 1 of the first auxiliary request filed with the appellant's statement of grounds of appeal already specified that the lens holding means moved through the lens inspection position (see line 15), it is self-evident that some kind of "transport subsystem" must have been provided for achieving movement of the lens holding means through the lens inspection position. Moreover, the appellant did not rely on the feature of a transport subsystem as providing any positive contribution to the patentability of the claimed subject-matter and, indeed, such "transport subsystem" is present also in the device of the closest prior art document D1, for the centring of lenses in the lens inspection position.

For the above reasons, the late filing of the

appellant's first auxiliary request at the oral proceedings of 19 March 2003 cannot be considered to have resulted for the adverse party in any surprise or difficulty in properly addressing all the points at issue. This late filed first auxiliary request can therefore be admitted into the procedure.

3.2 Compliance of the amendments with the requirements of Article 123(2) and (3) EPC

As compared to claim 1 as granted, claim 1 of the appellant's first auxiliary request was supplemented with an indication that the means for holding an ophthalmic lens are included into a transport subsystem for continuously moving a multitude of ophthalmic lenses along a predetermined path to move each of those lenses, one at a time, into a lens inspection position. The claim now also specifies that a light pulse is directed through each lens holding means "as it moves continuously through the lens inspection position" and that the light pulses scattered by the ophthalmic lens are directed past the stop and onto the signal generating means "as each ophthalmic lens moves continuously through the inspection position".

The description of the application as originally filed expressly disclosed that a "transport subsystem 12 is provided to move a multitude of ophthalmic lenses along a predetermined path to move each of those lenses, one at a time, into a lenses inspection position" and that an illumination subsystem is provided "to generate a series of light pulses and to direct a respective one light pulse onto light path 82 and through each ophthalmic lens moving through the lens inspection position" (see page 8, the first and the second

sentences of the second paragraph).

Since the mentioned passage stresses the function of the transport subsystem without any reference to the details of the specific embodiment described in conjunction with Figure 4, the Board cannot agree to the respondent's argument that the original application documents provide support only for such specific embodiment but not for the generalised definition introduced into claim 1.

Accordingly, the amendments made in claim 1 in accordance with the appellant's first auxiliary request cannot be considered to result in the patent containing subject-matter which extends beyond the content of the application as filed, and they also limit the scope of the claim as granted. The amendments therefore comply with the requirements of Article 123(2) and (3) EPC.

3.3 Clarity

Since the lens inspection system set out in claim 1 expressly allows for obtaining images as each ophthalmic lens moves continuously through the inspection position, it must necessarily include some means for achieving movement of the lenses. The Board cannot therefore follow the respondent's view that the transport subsystem for continuously moving the lenses is not part of the lens inspection system as such and should not therefore be recited in claim 1.

Accordingly, claim 1 of the appellant's first auxiliary request in the Board's view satisfies the requirement of Article 84 that the claims be clear.

3.4 Patentability

Claim 1 of the appellant's first auxiliary request defines a lens inspection system which is capable of achieving inspection of lenses as they move continuously through the lens inspection position.

None of the prior art citations on the file discloses an inspection system having this capability. Document D1, the closest prior art citation, discloses a lens inspection system which requires precise centring of each lens before imaging, using a so-called "Halte- und Transporteinrichtung" which not only moves the lens into its correct position but also maintains it during the imaging step (see page 4, lines 14 to 18 and 44 to 48 in conjunction with Figure 1). This arrangement cannot be considered to prompt the skilled person to envisage inspection of continuously moving lenses.

For these reasons, the subject-matter of claim 1 of the appellant's first auxiliary request, which embodies the use of a new combination of a particular dark-field illumination technique with pulsed illumination so as to effectively achieve continuous lens monitoring and does not derive in an obvious way from the closest prior art as disclosed in document D1, involves an inventive step within the meaning of Article 56 EPC.

4. The subject-matter of the remaining claims 2 to 14 also involves an inventive step within the meaning of Article 56 EPC by virtue of their appendance to independent claim 1.

The description was adapted to the claims as amended in compliance with the requirement of Article 27(1)(c)

EPC.

Since the summary of the objects met by the invention in column 2, lines 13 to 31 of the description expressly includes the provision of "illumination and imaging subsystems that are very well suited for use in a high speed automated lens inspection system", the Board cannot endorse the respondent's objection that the statement of these objects is not consistent with the subject-matter of claim 1.

Neither can the Board endorse the further objection that the last paragraph of the description is too general. This paragraph simply expresses in standard terms the largely accepted view that the scope of the claims of a patent is generally not limited to the very embodiments actually described in the specification.

Since, taking into consideration the amendments made to it, the patent and the invention to which it relates meet the requirements of the convention, maintenance of the patent as so amended can be decided in accordance with the appellant's first auxiliary request (see Article 102(3) EPC).

The appellant's second auxiliary request need not be considered further, accordingly.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

3. The case is remitted to the first instance with the order to maintain the patent as amended in the following version:

description: pages 3, 4, 6, 7 and 9 to 19 of the patent specification;
pages 2, 5 and 8 presented at the oral proceedings of 19 March 2003;

claims 1 to 14 of the first auxiliary request presented at the oral proceedings of 19 March 2003;

drawings of the patent specification.

The Registrar:

The Chairman:

P. Martorana

E. Turrini