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**Datasheet for the decision  
of 9 May 2012**

**Case Number:** T 0412/09 - 3.4.02

**Application Number:** 05254262.8

**Publication Number:** 1617175

**IPC:** G01B11/30, G01N21/57

**Language of the proceedings:** EN

**Title of invention:**  
Glazing inspection

**Applicant:**  
Pilkington Group Limited

**Relevant legal provisions:**  
EPC Art. 56

**Keyword:**  
Inventive step (no - all requests) - Series of patents as  
evidence of common general knowledge

**Decisions cited:**  
T 890/02, T 151/05, T 452/05



Case Number: T0412/09 - 3.4.02

**D E C I S I O N**  
of the Technical Board of Appeal 3.4.02  
of 9 May 2012

**Appellant:** Pilkington Group Limited  
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**Representative:** Towlson, Samantha Jayne  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 31 July 2008  
refusing European patent application No.  
05254262.8 pursuant to Article 97(2) EPC.

**Composition of the Board:**

**Chairman:** A. G. Klein  
**Members:** F. J. Narganes-Quijano  
D. Rogers

## Summary of Facts and Submissions

- I. The appellant (applicant) lodged an appeal against the decision of the examining division to refuse European patent application No. 05254262.8 (publication No. 1617175).

In its decision the examining division held with regard to the set of claims then on file, among other objections, that the claimed subject-matter did not involve an inventive step (Article 56 EPC) in view of the closest state of the art represented by document

D2: US-A-6100990.

- II. With the statement setting out the grounds of appeal the appellant submitted sets of claims amended according to a main and first to fifth auxiliary requests.

- III. In a communication annexed to summons to oral proceedings the Board referred to the following documents:

A1: US-A-2002070278

A2: US-A-2003218753

A3: US-A-2002097490

A4: US-A-5568258

and gave a preliminary assessment of the case.

- IV. In reply to the Board's communication the appellant submitted by letter dated 5 April 2012 sets of claims amended according to a sixth and a seventh auxiliary request and requested that the decision under appeal be

set aside and a patent be granted on the basis of the main or one of the first to seventh auxiliary requests.

In the same letter the appellant announced its intention not to attend the oral proceedings.

- V. Oral proceedings were held before the Board on 9 May 2012. The appellant was neither present nor represented at the oral proceedings.

At the end of the oral proceedings the Board announced the decision reported in the order below.

- VI. The wording of independent claims 2 and 3 of the main request reads as follows:

" 2. A glazing inspection apparatus for determining the optical quality of a glazing, the apparatus comprising: a digital video projector (10) for generating a greyscale pattern; a CCD camera (16); and a screen (12), the apparatus being adapted such that the greyscale pattern is projected directly onto the glazing and reflected onto the screen and the CCD camera captures images of the reflected greyscale pattern from the screen for subsequent processing, characterised in that the CCD camera has an exposure time which is set to be identical to or an integer multiple of a pulse width modulation period of the digital video projector."

" 3. A glazing inspection apparatus for determining the optical quality of a glazing, the apparatus comprising: a digital video projector (10) for generating a greyscale pattern; a CCD camera (16) and a screen (12), the apparatus being adapted such that the greyscale pattern is projected through the glazing onto the

screen and the CCD camera captures images of the reflected greyscale pattern from the screen for subsequent processing, characterised in that the CCD camera has an exposure time which is set to be identical to or an integer multiple of a pulse width modulation period of the digital video projector."

The wording of claim 1 of the first auxiliary request reads as follows:

" 1. A glazing inspection apparatus for determining the optical quality of a glazing (14), the apparatus comprising: a digital video projector (10) for generating a greyscale pattern; a CCD camera (16); and a screen (12), the apparatus being adapted such that

- the greyscale pattern is projected onto the screen and the reflection off the glazing of the greyscale image on the screen is captured by the CCD camera for subsequent processing; or
- the greyscale pattern is projected directly onto the glazing and reflected onto the screen and the CCD camera captures images of the reflected greyscale pattern from the screen for subsequent processing; or
- the greyscale pattern is projected through the glazing onto the screen and the CCD camera captures images of the reflected greyscale pattern from the screen for subsequent processing; or
- the greyscale pattern is projected onto the screen and the CCD camera captures images of the reflected greyscale pattern from the screen transmitted through the glazing, for subsequent processing,

characterised in that the CCD camera has an exposure time which is set to be identical to or an integer

multiple of a pulse width modulation period of the digital video projector."

The wording of independent claim 4 of the second auxiliary request reads as follows:

" 4. A glazing inspection apparatus for determining the optical quality of a glazing, the apparatus comprising: a digital video projector (10) for generating a greyscale pattern; a CCD camera (16) and a screen (12), the apparatus being adapted such that the greyscale pattern is transmitted through the glazing, reflected from the screen captured by the CCD camera for subsequent processing, characterised in that the CCD camera has an exposure time which is set to be identical to or an integer multiple of a pulse width modulation period of the digital video projector."

The wording of independent claims 2 and 3 of the third auxiliary request reads as follows:

" 2. A method for determining the optical quality of a glazing comprising generating a greyscale pattern with a digital video projector (10); projecting the greyscale pattern directly onto the glazing and reflecting the greyscale pattern onto a screen (12); and capturing images of the reflected greyscale pattern from the screen with a CCD camera; characterised in that the CCD camera has an exposure time which is set to be identical to or an integer multiple of a pulse width modulation period of the digital video projector."

" 3. A method for determining the optical quality of a glazing comprising generating a greyscale pattern with a digital video projector (10); projecting the

greyscale pattern through the glazing onto a screen (12); and capturing images of the reflected greyscale pattern from the screen with a CCD camera (16), characterised in that the CCD camera has an exposure time which is set to be identical to or an integer multiple of a pulse width modulation period of the digital video projector."

The wording of independent claim 4 of the fourth auxiliary request reads as follows:

" 4. A glazing inspection method for determining the optical quality of a glazing (14) comprising the steps of: digitally generating a greyscale pattern; transmitting the greyscale pattern through the glazing; projecting the greyscale pattern onto a screen (12); capturing the transmitted greyscale pattern for subsequent processing using a CCD camera (16); characterised in that the CCD camera has an exposure time which is set to be identical to or an integer multiple of a pulse width modulation period of the digital video projector."

The wording of claim 1 of the fifth auxiliary request is identical to that of independent claim 4 of the fourth auxiliary request.

The wording of each of independent claims 2 and 3 of the sixth and the seventh auxiliary requests differs from that of the respective independent claims 2 and 3 of the main and the third auxiliary requests in the deletion of the expression "or an integer multiple of".

The wording of the remaining claims of the appellant's requests is not pertinent to the present decision.

VII. The arguments submitted by the appellant in support of its requests, as far as they are pertinent to the present decision, can be summarised as follows:

The difference between the apparatus defined in independent claim 2 of the main request and the apparatus disclosed in document D2 is that the CCD camera has an exposure time which is set to be identical to or an integer multiple of a pulse width modulation period of the digital video projector. The technical effect of this distinguishing feature is that the optical quality of the glazing is determined in a repeatable way, and the feature is neither disclosed nor suggested in the documents considered by the examining division.

The apparatus defined in independent claim 3 of the main request is further distinguished from the apparatus of document D2 in that the grey scale pattern is transmitted through the glazing, and this feature solves the problem of measuring the optical quality of the glazing in transmission.

Documents A1 to A3 are patent applications and as such they are not representative of the common general knowledge of the person skilled in the art because, as noted in decision T 890/02, the common general knowledge is normally represented by encyclopaedias, textbooks, dictionaries and handbooks on the subject in question. In addition, document A1 is concerned with the problem of scanning electronic barcodes and not glazings. Document A2 is only concerned with the dynamic testing of the transient behaviour characteristics of individual micromirrors in a DMD micromirror array, and document A3 relates to a confocal microscope that is not suitable for



determining the optical quality of a glazing. Thus, these documents pertain to different technical fields. It would have been an undue effort for the person skilled in the art to find these documents and to identify the pertinent technical teachings, and in any case there is no motivation for the skilled person to consult any of these documents.

For analogous reasons, the subject-matter of the independent claims of the first to seventh auxiliary requests is novel and involves an inventive step. In particular, the teaching of document A2 relating to setting the exposure time of the optical sensor so as to capture a few tens of cycles of the driving signal does not render the subject-matter of the invention as defined in the sixth and the seventh auxiliary requests obvious.

## **Reasons for the Decision**

1. The appeal is admissible.
2. *Main request*
  - 2.1 *Independent claim 2*
    - 2.1.1 Document D2 discloses an apparatus for inspecting a glazing and determining its optical quality (abstract and column 2, lines 26 to 33) and is considered to represent the closest state of the art. The apparatus comprises a projector for generating a greyscale pattern, a digital camera and a screen, these components being arranged so that the greyscale pattern is projected directly onto the glazing and reflected

onto the screen and the camera captures images of the reflected greyscale pattern from the screen for subsequent processing (Figure 2 and column 3, lines 49 to 62, together with column 2, lines 26 to 61).

During the appeal proceedings the appellant has not disputed that a projector having the characteristics of the projector disclosed in document D2 (column 2, lines 33 to 49) constitutes, as held by the examining division in the decision under appeal, a digital video projector as claimed. In addition, the appellant has not disputed that, as noted by the Board in the communication annexed to the summons to oral proceedings, it was straightforward at the priority date of the application to implement a digital camera having the characteristics required in document D2 (column 2, lines 50 to 61) in the form of a CCD camera.

- 2.1.2 When compared with the apparatus disclosed in document D2 and referred to above, independent claim 2 of the main request further requires that the exposure time of the CCD camera is set to be identical to or an integer multiple of the pulse width modulation period of the digital video projector. According to one of the lines of argument followed by the examining division in its decision, this feature constitutes an acquisition procedure generally known by the person skilled in the field of digital signal capturing, timing and synchronization. The appellant has contested this finding.

According to the disclosure of the invention (page 1 of the description, fourth paragraph, together with page 5, first two paragraphs) and the submissions of the appellant (cf. point VII above), the technical effect of the claimed feature under consideration is to

improve the repeatability of the inspection procedure carried out with the inspection apparatus.

The technical relevance of the repeatability of the inspection results obtained with the apparatus under consideration is already expressly acknowledged in document D2 (column 1, lines 24 to 29). Although the document is silent as to the exposure time of the digital camera, the skilled person would select the exposure time to be identical to, or an integer multiple of, the pulse width modulation period of the digital video projector as claimed in order to ensure the repeatability of the inspection results. Indeed, in the event that the skilled person would have selected an arbitrary value of the exposure time different from the claimed value, then the mismatch between the image capturing sequences of the digital camera and the display sequences of the digital projector would have produced image noise and/or recording artefacts. These would have caused a degradation of the quality of the captured images and, more particularly, would have impaired the repeatability of the inspection results, contrary to the requirements in document D2 relating to the repeatability of the inspection results. In these circumstances, the skilled person would have immediately noticed the image noise and/or recording artefacts and would have realized that they were caused by a mismatch between the image capturing sequences of the camera and the display sequences of the projector. This would have prompted the skilled person to select an appropriate value for the exposure time and/or the pulse width modulation period in order to solve the problem, thus resulting in a value of the exposure time satisfying the claimed condition.

This obvious procedure reflects a common practice belonging - as held by the examining division in its decision - to the common general knowledge in the technical field of digital signal capturing, timing and synchronization. It is a common practice in the art of capturing the image of a rapidly varying periodic display (such as the digital image display of a LCD, a DMD, etc.) by means of a digital camera, and in particular a CCD camera, to select the exposure time of the camera to be identical to or an integer multiple of the display period. This is done in order to avoid image noise and/or recording artefacts that would otherwise result from the mismatch between the image capturing sequences of the camera and the display sequences. As an illustration of this common general knowledge, the Board referred in its communication to the following documents, all of which are US patent applications:

- document A1, in which the exposure time of a CCD camera arranged to capture the image from an electronic LCD display is set to be an integer multiple of the refresh period of the image display in order to avoid temporal interference between the camera and the display (abstract and paragraphs [0030] and [0057] to [0059]);
- document A2, in which the exposure time of a CCD camera used to test a DMD micromirror array is set to be a few tens of the cycle period of the driving signal of the DMD array (abstract and paragraphs [0029], [0041] and [0042]); and
- document A3, in which the exposure time of a CCD camera is selected to be an integer multiple of the imaging cycle of an imaging device of the type comprising a pin-hole patterned rotary disk (abstract and paragraph [0176]).

The Board therefore considers that the skilled person seeking to implement the teaching of document D2 using a CCD camera would, in view of the requirements in document D2 relating to the repeatability of the inspection results and in view of the common general knowledge referred to above, select the exposure time of the camera as claimed, or would do so when noticing the image noise or recording artefacts that would otherwise appear in the images captured by the CCD camera.

- 2.1.3 In its letter of reply the appellant disputed that the image acquisition procedure referred to above belonged to the common general knowledge and submitted that according to the established case law patents cannot be used to establish common general knowledge.

While the Board concurs with the appellant that the common general knowledge of the person skilled in the art is, as a general rule, established on the basis of encyclopaedias, textbooks and the like (see decision T 890/02, OJ EPO 2005, 497 cited by the appellant, point 2 of the reasons), contrary to the appellant's submissions this does not mean that a disclosure is automatically discarded as evidence in this regard for the mere fact of being disclosed in a patent specification. On the contrary, the case law contemplates exceptions to the general rule mentioned above and allows in particular circumstances the establishment of common general knowledge on the basis of the content of patent specifications (see T 890/02, *supra*, point 2, and "Case Law of the Boards of Appeal" EPO, 6th edition, 2010, chapter I, section C.1.5 and last paragraph of section C.3.2.6), and in particular when a series of patent specifications provides a consistent picture that a particular technical

procedure was generally known and belonged to the common general knowledge in the art at the relevant date (see decisions T 151/05, points 3.4.1, 4.1 and 4.3 of the reasons, and T 452/05, point 2.4.1, paragraph (b) (ii)).

As already noted in point 2.1.2 above, documents A1, A2 and A3 provide a consistent picture that setting the exposure time of a CCD camera to be identical to or an integer multiple of the display period of a rapidly varying periodic display to be captured by the camera constituted a common practice in the art. Therefore these documents constitute *prima facie* evidence that this practice constituted common general knowledge at the priority date of the application in suit, and the appellant's mere submission that patents cannot be used in establishing common general knowledge is insufficient to rebut or displace this evidence or to cast doubts on the common general knowledge under consideration.

The appellant submitted that documents A1 to A3 pertain to technical fields different from that of the claimed invention (cf. point VII above). The Board notes, however, that in the circumstances of the present case the question is not whether the skilled person would be expected to consult these documents when operating the apparatus of document D2, but whether the documents constitute evidence supporting the position that the common practice mentioned above was generally known to him. In documents A1 to A3 different value ranges of the exposure time of the CCD camera (in particular, "2 or more" periods in document A1 (paragraph [0058]), "a few tens" in document A2 (paragraph [0041]), and "the shortest [period] ... multiplied by an integer" in document A3 (paragraph [0176])) are selected in order

to cope with the specific technical situations encountered in the respective technical fields; however, it is taken for granted in the disclosure of all these documents that, when capturing a periodic display with a CCD camera, the value of the exposure time of the camera is to be selected to correspond to the display period or to a multiple integer of the same. This procedure relates to the operation of the CCD camera itself and not to the specific technical field in which the camera is being used in each of documents A1 to A3.

2.1.4 Having regard to the above considerations, the Board concludes that the apparatus defined in independent claim 2 of the main request does not involve an inventive step (Article 56 EPC).

2.2 *Independent claim 3*

The apparatus defined in independent claim 3 of the main request corresponds to the apparatus defined in independent claim 2, the only difference being that the greyscale pattern is not reflected but transmitted by the glazing. As already noted in the Board's communication annexed to the summons to oral proceedings, whether a glazing is inspected by reflection or by transmission depends on the type of glazing and on the glazing characteristics to be inspected. In this art whether to inspect the glazing by reflection or by transmission depends on the circumstances, see for instance document A4, column 1, lines 15 to 29, and this choice is merely one of convenience. Thus no exercise of inventive skill is required to make this choice. In these circumstances, it is obvious to modify the apparatus disclosed in document D2 with reference to Figure 2 so as to inspect

the glazing by transmission instead of by reflection when the circumstances made it desirable. This modification of the apparatus disclosed in document D2 requires only straightforward technical measures involving no technical difficulty.

These considerations were not subsequently disputed by the appellant, and the Board has no reason to depart from the preliminary view expressed in its communication.

In view of these considerations and of the conclusion in point 2.1.4 above, the Board concludes that the subject-matter of independent claim 3 of the main request does not involve an inventive step (Article 56 EPC).

3. *First auxiliary request*

As already noted in the Board's communication annexed to the summons to oral proceedings, the Board considered that claim 1 of the first auxiliary request reformulates as different alternatives in one single independent claim the subject-matter of independent claims 1 to 4 of the main request. The appellant has not contested the Board's view in this respect.

Accordingly, the subject-matter of claim 1 of the first auxiliary request does not involve an inventive step (Article 56 EPC) because the alternatives defined in the claim and corresponding to the subject-matter of each of independent claims 2 and 3 of the main request do not involve an inventive step for the reasons already given in points 2.1 and 2.2 above.

4. *Second auxiliary request*



As already noted in the Board's communication annexed to the summons to oral proceedings, independent claim 4 of the second auxiliary request defines the same or a broader subject-matter than independent claim 3 of the main request. The appellant has not contested the Board's view in this respect. Accordingly, the subject-matter of independent claim 4 of the second auxiliary request does not involve an inventive step (Article 56 EPC) for the same reasons already given in point 2.2 with regard to independent claim 3 of the main request.

5. *Third to fifth auxiliary requests*

As already noted in the Board's communication annexed to the summons to oral proceedings,

- independent claims 2 and 3 of the third auxiliary request define methods the steps of which are in one-to-one correspondence with the functional features of the different means of the apparatus defined in independent claims 2 and 3 of the main request, respectively,
- independent claim 4 of the fourth auxiliary request defines a method the steps of which are in one-to-one correspondence with the functional features of the different means of the apparatus defined in independent claim 3 of the main request, and
- independent claim 1 of the fifth auxiliary request is identical to independent claim 4 of the fourth auxiliary request,

and in these circumstances lack of inventive step of the apparatus defined in independent claims 2 and 3 of the main request implies a lack of inventive step for the methods under consideration. In its letter of reply the appellant did not contest this view.

Accordingly, the methods defined in independent claims 2 and 3 of the third auxiliary request, in independent claim 4 of the fourth auxiliary, and in independent claim 1 of the fifth auxiliary request do not involve an inventive step (Article 56 EPC) for reasons analogous to those given in point 2.1 and 2.2 above with regard to independent claims 2 and 3 of the main request.

6. *Sixth and seventh auxiliary requests*

Independent claims 2 and 3 of the sixth auxiliary request define the same apparatus defined in the first of the alternatives defined in independent claims 2 and 3 of the main request and in which the exposure time of the CCD camera is set "to be identical to" the pulse width modulation period of the digital video projector. Likewise, independent claims 2 and 3 of the seventh auxiliary request define the same method defined in the first of the alternatives defined in independent claims 2 and 3 of the third auxiliary request and in which the exposure time of the camera is set "to be identical to" the modulation period of the projector.

As already concluded in points 2 and 5 above, the apparatus defined in independent claims 2 and 3 of the main request and the methods defined in independent claims 2 and 3 of the third auxiliary request do not involve an inventive step because it is obvious to select the value of the exposure time of the digital camera to be identical to or an integer multiple of the pulse width modulation period of the digital projector. In these circumstances, the selection of the simplest and the most straightforward of the alternatives, i.e. an integer value of one, resulting in the exposure time

being identical to the modulation period, constitutes an obvious alternative that the skilled person would have considered in accordance with the particular circumstances (see also in this regard the last paragraph of point 2.1.3 above). In addition, the appellant has not identified any specific technical effect or particular advantage that would go beyond those that the skilled person would have readily considered in advance.

Having regard to the above, the apparatus defined in independent claims 2 and 3 of the sixth auxiliary request and the methods defined in independent claims 2 and 3 of the seventh auxiliary request do not involve an inventive step (Article 56 EPC).

7. Since none of the claim requests submitted by the appellant is allowable, the appeal has to be dismissed.

**Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:



M. Kiehl

A. G. Klein

Decision electronically authenticated