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**Datasheet for the decision
of 24 June 2016**

Case Number: T 1738/14 - 3.2.05

Application Number: 08762344.3

Publication Number: 2152526

IPC: B42D15/10

Language of the proceedings: EN

Title of invention:
Holographic Security Device

Patent Proprietor:
De La Rue International Limited

Opponents:
Giesecke & Devrient GmbH
Leonhard Kurz Stiftung & Co. KG

Relevant legal provisions:
EPC 1973 Art. 54
RPBA Art. 12(4), 13(1)

Keyword:

Novelty - main request (no) - auxiliary request 1 (no)

Admissibility of auxiliary requests 2 and 3 - request clearly allowable (no)

Admissibility of late-filed auxiliary request 4 - could have been presented at first instance proceedings (no)



Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 1738/14 - 3.2.05

D E C I S I O N
of Technical Board of Appeal 3.2.05
of 24 June 2016

Appellant: De La Rue International Limited
(Patent Proprietor) De La Rue House
Jays Close
Viables
Basingstoke Hampshire RG22 4BS (GB)

Representative: Gill Jennings & Every LLP
The Broadgate Tower
20 Primrose Street
London EC2A 2ES (GB)

Respondent I: Giesecke & Devrient GmbH
(Opponent 1) Prinzregentenstr. 159
81677 München (DE)

Representative: Patentanwälte Geyer, Fehners & Partner mbB
Perhamerstrasse 31
80687 München (DE)

Respondent II: Leonhard Kurz Stiftung & Co. KG
(Opponent 2) Schwabacher Strasse 482
90763 Fürth (DE)

Representative: Louis Pöhlau Lohrentz
Patentanwälte
Postfach 30 55
90014 Nürnberg (DE)

Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 16 June 2014
revoking European patent No. 2152526 pursuant to
Article 101(2) EPC.**

Composition of the Board:

Chairman M. Poock
Members: S. Bridge
 D. Rogers

Summary of Facts and Submissions

- I. The appeal was lodged by the patent proprietor against the decision of the opposition division revoking the European patent No. 2 152 526 for lack of novelty of claim 1 with respect to document E1.
- II. Two oppositions were filed against the patent as a whole based on Article 100(a) EPC (lack of novelty, Article 54 EPC 1973, and lack of inventive step, Article 56 EPC 1973).
- III. Oral proceedings were held before the board of appeal on 24 June 2016 in the absence of the appellant, whose representatives had previously informed the board that they would not attend.
- IV. The requests of the appellant (made in writing) were to set aside the decision under appeal and, as a main request, to maintain the patent as granted, or alternatively to maintain the patent upon the basis of one of auxiliary requests 1 to 3, filed under cover of a letter dated 22 October 2014, or alternatively, to maintain the patent upon the basis of auxiliary request 4, filed under cover of a letter dated 19 May 2016.
- V. The requests of respondents I and II (opponents 1 and 2) were to dismiss the appeal.
- VI. Claim 1 as granted (main request) reads as follows:

"A holographic security device comprising at least first and second diffractive image generating structures recorded in respective sets of substantially non-overlapping regions of a record medium, the regions of one set being interleaved with regions of the other

set, whereby both interleaved regions are substantially non-visible to the unaided eye, whereby the holographic security device generates two or more optically variable images viewed from separate and/or overlapping viewing directions around the device and seen by tilting the device, and whereby each particular optically variable image in a given viewing direction is generated by the diffractive image generating structure associated with one set of interleaved lines, characterised in that the first diffractive image generating structure has been formed to have a diffuse diffractive replay and the second diffractive image generating structure has been formed to have a non-diffuse or specular diffractive replay."

VII. Claim 1 according to auxiliary request 1 differs from claim 1 according to the main request in that the characterising part reads (additions underlined by the board):

"the first diffractive image generating structure has been formed to have a diffuse diffractive replay, each point on the surface of the first diffractive image generating structure having a diffractive surface relief which is the superposition of different diffraction grating functions that differ in periodicity and/or orientation and/or phase, and the second diffractive image generating structure has been formed to have a non-diffuse or specular diffractive replay, the second diffractive image generating structure having a singular grating periodicity, a singular grating orientation or azimuthal angle, and a singular grating phase".

- VIII. Claim 1 according to auxiliary request 2 differs from claim 1 according to the main request in that in the preamble the text "*separate and/or*" has been deleted before the text "*overlapping viewing directions*".
- IX. Claim 1 according to auxiliary request 3 differs from claim 1 of the main request in that it contains in combination each of the amendments respectively introduced into the respective claim 1 of auxiliary requests 1 and 2.
- X. Auxiliary request 4 corresponds to granted claims 14 to 23 which have been renumbered as claims 1 to 10.
- XI. The following document is referred to in the present decision:
- E1: WO-A-95/04948.
- XII. In the written procedure, the appellant argued essentially as follows:

Main request

The subject-matter of claim 1 requires that the (first) diffractive image generating structure be formed as "*a superposition of different grating functions*" (grounds of appeal, paragraphs 3, 6 and 18) on the basis of the definition provided in the description of the patent in suit (column 4, lines 22 to 29: "*each point on the surface will have diffractive surface relief which is the superposition of different grating functions - that is to say that grating structures which differ in periodicity and or orientation and or phase*") and wherein a grating function is as defined in paragraphs

[0010] and [0011] (grounds of appeal, paragraphs 8 and 10).

Track 12 in Figure 7 of document E1 is formed by a sequence of SIC (Specular Image Component) elements placed side by side in the manner described in paragraph [0015] of the patent in suit. Although light impinging on track 12 causes diffraction in different directions, this does not mean that the structure of the diffractive image generating structure 12 falls within the definition of claim 1 in the context of the definition in the patent as explained above: the patent defines the manner in which the structure must be formed and in particular to be a superposition of different grating functions.

Therefore, the subject-matter of claim 1 as granted is new with respect to document E1.

Auxiliary requests 1 to 3

The appellant was not allowed to file such auxiliary requests during the oral proceedings before the opposition division (see point 9 of the contested decision). Since the preliminary opinion of the opposition division considered all granted claims to be patentable, there was no reason for the appellant to do so.

The amendments made to claim 1 according to auxiliary request 1 incorporate more detailed definitions of the diffractive structures with "diffuse refractive replay" and "specular diffractive replay" respectively and include the definitions which the appellant has always argued were already effectively in the claims. These amendments can come as no surprise to the opponents and

are occasioned by the decision of the opposition division.

In consequence, auxiliary requests 1 to 3 should be admitted into the proceedings and the subject-matter of claim 1 according to auxiliary request 1 is new with respect to document E1 for the reasons argued in the context of the main request.

Auxiliary request 4

Claims 1 to 10 according to auxiliary request 4 correspond to granted claims 14 to 23 and thus present no new issues. Since the decision under appeal does not make any reference to the novelty of claim 14 as granted, it would be unfair on the appellant if claim 1 was found to lack novelty and thus the main request and auxiliary requests 1 to 3 were also rejected, without a proper consideration of the patentability of claim 14 as granted. Thus, the appellant further requests that the case be remitted to the department of first instance for further prosecution on the basis of auxiliary request 4.

XIII. The arguments of the respondents in the written and oral proceedings can be summarised as follows:

Main request

Document E1 directly and unambiguously discloses the features of the characterising part of claim 1 as granted, because the general description of figure 7 (page 15, lines 5 to 13) refers to both the embodiments of figure 6 (page 14, lines 24 to 33) and figure 1 (page 7, lines 12 to 16) which respectively disclose "*carrier waves*", with image information being encoded

into them by means of [...] groove spacing variations"
10, 12 as a first diffractive image generating structure formed to have a diffuse diffractive replay and a series of straight lines or grooves which extend across the width of the track 11 as a second diffractive image generating structure formed to have a non-diffuse or specular diffractive replay. In addition, figure 7, when considered as an embodiment of the invention of document E1 (page 15, lines 13 to 17), also directly and unambiguously discloses such an arrangement.

The appellant's argument that each point on the surface of the first diffractive image generating structure has a diffractive surface relief which is the superposition of different diffraction grating functions that differ in periodicity and/or orientation and/or phase is not included in the wording of claim 1 and, furthermore, only concerns mental imagery, since any periodic function can be also expressed as a Fourier series, i.e. as the superposition of a set of sinusoidal functions each of which corresponds to an elementary grating functions as defined in paragraphs [0010] and [0011] of the patent in suit.

Therefore, the subject-matter of granted claim 1 lacks novelty with respect to document E1.

Auxiliary requests 1 to 4

Late filed auxiliary requests 1 to 4 should not be admitted into the proceedings.

The amendment to claim 1 according to auxiliary request 1 does not add any technical features and thus

is not suited to overcoming the lack of novelty objection raised against claim 1 of the main request.

As noted in the reply to grounds of appeal (reply to the grounds of appeal by respondent II dated 9 March 2015, page 31, point 3.3), the subject-matter of claim 1 according to auxiliary request 2 is disclosed implicitly in document E1, because of the manner in which diffuse light is refracted into a spread of different directions. This amendment is thus not suited to overcoming the lack of novelty objection raised against claim 1 of the main request.

The comments made with respect to auxiliary requests 1 and 2 apply in combination to auxiliary requests 3.

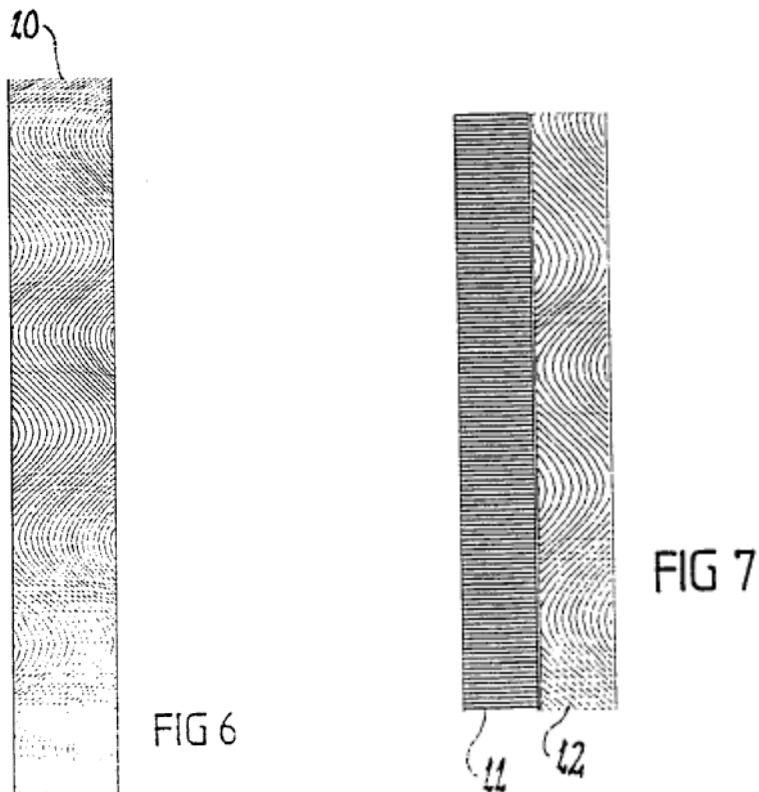
The opposition division indicated that a request exclusively based on granted claims would be admitted into the opposition proceedings, but the appellant did not file such an auxiliary request (minutes, point 7). Auxiliary request 4 is such a request and the appellant could have filed it during the opposition proceedings but did not do so. There are thus no reasons for admitting auxiliary request 4 at this late stage of the appeal proceedings.

Reasons for the Decision

1. *Novelty of the subject-matter of claim 1 according to the main request with respect to document E1*
- 1.1 The only features of granted claim 1 (main request) whose disclosure with respect to figure 7 of document E1 is contested between the parties are the

features of the characterising part, namely, that "the first diffractive image generating structure has been formed to have a diffuse diffractive replay".

1.2 Document E1 discloses with respect to figure 7 (page 15, lines 5 to 17) that the "Left track 11 may be any one of the types of tracks illustrated in Figures 1, 2, 3, 4 and 8 and right track 12 is a track of the type shown in Figure 6".



1.2.1 The reference to "any one of the types of tracks illustrated in Figures 1, 2, 3, 4 and 8" requires the skilled person to consider tracks which have a "surface relief structure compris[ing] a series of [] straight lines or grooves which extend across the width of the track" (page 7, lines 12 to 16). Such a surface structure corresponds to an elementary grating function as defined in paragraphs [0010] and [0011] of the patent in suit and which results in specular

diffractive replay (paragraph [0013] of the patent in suit). This was not contested by the appellant.

- 1.2.2 With respect to figure 6, document E1 discloses that track 10 has grooves which extend substantially along the length of the track and essentially comprises "carrier waves", with image information being encoded into them by means of amplitude and groove spacing variations (page 14, lines 24 to 33).
- 1.2.3 Document E1 further discloses that *"in some embodiments, the variations in groove spacing, angle and curvature can be described by mathematical functions of two variables whose [determinant of the] Hessian [matrix] of second [order partial] derivatives with respect to the two variables is non-vanishing except along certain characteristic lines within each diffracting track, as previously discussed. However, this is not an essential condition, and in other embodiments the Hessian of second derivatives of the grating function may be identically zero for all points within the track"* (additions in square brackets by the board correspond to the formal mathematical formulation as understood by the skilled person - page 14, lines 34 to page 15, line 4; page 8, equation 2 of the determinant of the Hessian matrix - which incidentally contains a typesetting error in that one of the two δX^2 denominators should read δY^2).
- 1.2.4 The parties accept that when the *"Hessian of second derivatives of the grating function [is] identically zero for all points within the track"* (page 15, lines 1 to 4), the corresponding diffractive image generating structure satisfies the requirements set out in paragraph [0010] of the patent in suit for a "non-

diffuse (specular) diffracting structure" (paragraph [0009] of the patent in suit).

- 1.2.5 In consequence, the disclosure that track 10 of figure 6 comprises "*carrier waves*", with image information being encoded into them by means of amplitude and groove spacing variations (page 14, lines 24 to 33) implies that the condition that the "*Hessian of second derivatives of the grating function [is] identically zero for all points within the track*" is not met and that the diffractive replay from tracks 10 is diffuse.
- 1.2.6 Furthermore, it is acknowledged by the appellant that "*the effect of light impinging on the track 12 is to cause diffraction in different directions*" (emphasis in the original, grounds of appeal, page 4, paragraph 18). The parties thus agree that track 10 in figure 6 corresponding to track 12 in figure 7 has a "*diffractive image generating structure [which] has been formed to have a diffuse diffractive replay*".
- 1.2.7 Thus, document E1 directly and unambiguously discloses that track 12 of figure 7 has a diffuse diffractive replay.
- 1.2.8 Therefore, document E1 directly and unambiguously discloses both a first diffractive image generating structure (track 12 in figure 7) which has been formed to have a diffuse diffractive replay and a second diffractive image generating structure (track 11 in figure 7) which has been formed to have a non-diffuse or specular diffractive replay.
- 1.3 It was further argued on behalf of the respondents that document E1 not only refers to figure 7 in terms of a general schematic illustration but, in addition, also

considers figure 7 as itself illustrating a particular arrangement (page 15, lines 13 to 17) in which track 12 directly discloses a diffraction structure which, even if considered as a side by side sequence of SIC elements in the manner described in paragraph [0015] (grounds of appeal, page 4, point 19), implies that the corresponding diffractive replay is diffuse (patent in suit, paragraph [0015], first sentence). Track 11 in turn illustrates a diffraction structure comprised of a series of straight lines or grooves which extend across the width of the track, i.e. which result in specular diffractive replay (see above).

In consequence, when figure 7 is furthermore considered as directly illustrating a particular arrangement (page 15, lines 13 to 17), document E1 again directly and unambiguously discloses a first diffractive image generating structure (track 12 in figure 7) which has been formed to have a diffuse diffractive replay and a second diffractive image generating structure (track 11 in figure 7) which has been formed to have a non-diffuse or specular diffractive replay.

- 1.4 The appellant argued that claim 1 requires that the (first) diffractive image generating structure must be formed as "*a superposition of different grating functions*" (grounds of appeal, page 4, paragraph 18.) on the basis of the definition provided in the description of the patent in suit (column 4, lines 22 to 29: "*each point on the surface will have diffractive surface relief which is the superposition of different grating functions - that is to say that grating structures which differ in periodicity and or orientation and or phase*").

1.4.1 However, the wording of the corresponding feature of claim 1 "*the first diffractive image generating structure has been formed to have a diffuse diffractive replay*" is only expressed as a functional feature which does not place any explicit limitations on the nature of the *diffractive image generating structure*: any diffractive image generating structure suitable for producing a diffuse diffractive replay will do. As noted above, this is the case with track 12 in figure 7, respectively track 10 of figure 6.

1.4.2 Furthermore, the "*grating functions*" referred to in (column 4, lines 22 to 29) are defined in paragraphs [0010] and [0011] in terms of:

- "1. A singular grating periodicity (typically defined in lines per mm)
2. A singular grating orientation or azimuthal angle.
3. A singular grating phase - which determines at a microscopic level exactly which points in the x,y plane the grating relief experience its peak and troughs (maxima and minima)."

and thus also include simple periodic functions such as the sinusoidal functions.

1.4.3 The general mathematical principle of a Fourier series belongs to the common general knowledge of the skilled person who knows that any periodic function can be represented as the sum of a set of simple oscillating functions such as the sinusoidal functions.

1.4.4 Therefore the additional requirement ("*each point on the surface will have diffractive surface relief which is the superposition of different grating functions - that is to say that grating structures which differ in*

*periodicity and or orientation and or phase") advanced on behalf of the appellant, **even if it were included in the wording of claim 1**, only corresponds to a manner of mentally viewing the "*diffractive surface relief*" (for example, in terms of the sum of a set of simple oscillating functions such as the sinusoidal functions in a Fourier series) but does not define any further technical features (Respondent II's response to the grounds of appeal, dated 9 March 2015, point 2.3).*

1.5 In consequence, the subject-matter of claim 1 as granted (main request) lacks novelty with respect to document E1 (Article 100 (a) in combination with Article 54 EPC 1973).

2. *Auxiliary request 1 - Admissibility*

The ground of opposition of lack of novelty (article 100(a) in combination with article 54 EPC 1973) was already raised in the respective notice of opposition of each of the opponents, wherein opponent 2 presented reasoned novelty arguments amongst others with respect to figure 7 of document E1.

From the response to the grounds of opposition on, the appellant's position has been consistently, that the subject-matter of claim 1 had to be understood as requiring that the (first) diffractive image generating structure must be formed as "*a superposition of different grating functions*" (column 4, lines 22 to 29) of the kind defined in paragraphs [0010] and [0011].

Thus the amendments made to claim 1 according to auxiliary request 1 are consistent with the appellant's position and cannot come as a surprise to the other parties.

Although auxiliary request 1 could have been filed during the first instance proceedings, the appellant had no reason to do so, because in its provisional opinion of 4 October 2013 the opposition division considered that document E1 does not "*disclose the subject-matter of any of the claims of the patent*" (point 4.1) and that "*the patent in suit complies with the EPC*" (point 8).

In consequence, the board exercises its discretion under Article 12(4) RPBA and admits auxiliary request 1 into the procedure.

3. *Novelty of the subject-matter of claim 1 according to auxiliary request 1 with respect to document E1*

The amendments made to claim 1 according to auxiliary request 1 incorporate more detailed definitions of the diffractive structures with "diffuse refractive replay" and "specular diffractive replay" respectively and include the definitions, which the appellant has always argued were already effectively in granted claim 1.

The features corresponding to these amendments were already discussed in the context of the main request - see above point 1.4 and thus apply likewise to claim 1 according to auxiliary request 1.

In consequence, the subject-matter of claim 1 according to auxiliary request 1 is not new with respect to document E1 for the reasons already argued in the context of the main request.

4. *Auxiliary request 2 - Admissibility*

It was argued on behalf of the respondents that the subject-matter of claim 1 is not limited to particular lighting conditions and that the direction in which a diffractive structure diffracts incident light depends on the direction of the incident light beam. When viewed under diffuse light, typical for enclosed spaces, light impinges on the diffraction structure from many different directions (and not only from a single direction). The resulting spread of diffracted light results in a corresponding optical overlap of the diffraction effects of the different diffraction structures. The amended feature of claim 1 concerning the overlapping viewing directions according to auxiliary request 2 is therefore implicitly disclosed in document E1, because this effect necessarily occurs when viewing the diffraction structures under diffuse light.

The grounds of appeal provided no statement as to whether the amendment made to claim 1 according to auxiliary request 2 might restore novelty with respect to document E1, nor were there any subsequent arguments to this effect on behalf of the appellant.

The board thus concludes that the amended subject-matter of claim 1 according to auxiliary request 2 does not overcome the lack of novelty with respect to document E1 as discussed in the context of the main request.

Since the amendments introduced into claim 1 according to auxiliary request 2 do not overcome the grounds of opposition under Article 100(a) and 54 EPC 1973, there is no reason for the board to admit auxiliary request 2

into the proceedings: The board thus uses its discretion under Article 13(1) RPBA to not admit auxiliary request 2.

5. *Auxiliary request 3 - Admissibility*

Claim 1 according to auxiliary request 3 comprises in combination each of the amendments respectively introduced into the respective claim 1 of auxiliary requests 1 and 2. Since these amendments are independent of one another and neither of these amendments on their own established novelty over document E1, the same conclusion of lack of novelty carries over to claim 1 according to auxiliary request 3. There is therefore no reason for the board to admit auxiliary request 3 into the proceedings: The board thus uses its discretion under Article 13(1) RPBA to not admit auxiliary request 3.

6. *Auxiliary request 4 - Admissibility*

Auxiliary request 4 only consists of deleting granted claims 1 to 13 and suitably renumbering granted claims 14 to 23. It does not therefore raise any new issues for the respondents while effectively side-stepping the lack of novelty reasons for revoking the patent based on granted claim 1 as set out in the decision of the opposition division.

However, according to the minutes of the oral proceedings before the opposition division, the opposition division explicitly indicated that a further request exclusively based on granted claims would be admitted into the opposition proceedings. Nevertheless, the appellant chose not file such an auxiliary request (contested decision point 9 and minutes point 7).

In consequence, auxiliary request 4 is a request which the appellant could have filed during the opposition proceedings but chose not to do so. By not filing auxiliary request 4 before the opposition division the appellant has prevented the opposition division from deciding on granted claim 14. However, the appellant now requests such "*a proper consideration of the patentability of claim 14 as granted*" in the name of fairness. The appellant did not provide any reasons for its change of mind or for the very late filing of this request at the end of the appeal procedure.

The board thus cannot accept this fairness argument on behalf of the appellant, because the appellant already had the opportunity to file this request during the opposition proceedings and admitting such an auxiliary request at this late stage of the appeal proceedings with the probable consequential remittal to the department of first instance for further prosecution would unnecessarily prolong the duration of the proceedings which, in turn, would be unfair on the other parties.

In consequence, the board uses its discretion under Article 12(4) RPBA to not admit auxiliary request 4.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



D. Meyfarth

M. Poock

Decision electronically authenticated