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Datasheet for the decision of 10 November 2021

Case Number: T 1807/18 - 3.4.03

Application Number: 12761761.1

Publication Number: 2739483

IPC: B42D15/00, B41M3/14, D21H21/42, G02B5/04, G02B5/26, B42D25/29, B42D25/355

Language of the proceedings: EN

Title of invention:
IMPROVEMENTS IN SECURITY DEVICES

Patent Proprietor:
De La Rue International Limited

Opponent:
Giesecke+Devrient Currency Technology GmbH

Relevant legal provisions:
EPC Art. 52(1), 54(1), 54(2), 56, 111(1)
RPBA 2020 Art. 11, 13(2)

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It can be changed at any time and without notice

Keyword:

Novelty - main request, auxiliary request 2 (no)
Remittal to the department of first instance - special reasons (no)
Inventive step - auxiliary request 5 (no)
Amendment after summons - appellant's objection under Rule 80 EPC, respondent's auxiliary request 6 - taken into account (no)

Decisions cited:

G 0003/14, T 1148/12, T 1531/16, T 2063/15, T 1764/17

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Case Number: T 1807/18 - 3.4.03

D E C I S I O N
of Technical Board of Appeal 3.4.03
of 10 November 2021

Appellant: (Opponent)	Giesecke+Devrient Currency Technology GmbH Prinzregentenstraße 159 81677 München (DE)
Representative:	Klunker IP Patentanwälte PartG mbB Destouchesstraße 68 80796 München (DE)
Respondent: (Patent Proprietor)	De La Rue International Limited De La Rue House, Jays Close Basingstoke, Hampshire RG22 4BS (GB)
Representative:	Boult Wade Tennant LLP Salisbury Square House 8 Salisbury Square London EC4Y 8AP (GB)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 9 May 2018 rejecting the opposition filed against European patent No. 2739483 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	M. Papastefanou
Members:	M. Ley
	G. Decker

Summary of Facts and Submissions

I. The appeal is against the decision of the opposition division to reject the opposition against European patent No. EP 2 739 483 B1 according to Article 101(2), second sentence, EPC.

II. With the notice of opposition, the opponent filed *inter alia* the following documents:

D1 US 2007/02112338 A1
D4 WO 2006/087138 A1

In the notice of opposition, the opponent provided its interpretation of the wording of claim 1 of the patent. The patent was opposed under Article 100(a) EPC in combination with Articles 52(1), 54(1) and (2) EPC and with Article 56 EPC (lack of novelty and inventive step).

III. The appellant (opponent) requests that the impugned decision be set aside and the patent be revoked.

IV. The respondent (patent proprietor) requests as a main request that the appeal be dismissed, i.e. that the patent be maintained as granted. Should the main request not be allowable, it requests that the case be remitted to the opposition division for further prosecution. Alternatively, it requests that the patent be maintained in amended form on the basis of the claims according to auxiliary requests 2 or 5 filed with the letter dated 17 December 2018 or according to auxiliary request 6 filed with the letter dated 17 September 2021.

With its reply to the Board's communication pursuant to Article 15(1) RPBA 2020, the respondent submitted the following document:

D11 Sections 12.2 and 12.3 of Optical Document Security, Second Edition, Rudolf L. van Renesse (Editor), Artech House, 1997, London, pages 267 to 272

V. Using the opposition division's feature labelling, claim 1 as granted has the following wording:

(a) *A security device comprising a light deflection structure having a first side and a second opposing side,*
(b) *a colourshifting layer applied to the first side of the light deflection structure and*
(c) *a reflection layer applied to at least a first region of the second side of the light deflection structure*
(d) *so as to provide a strong reflection in a direction substantially parallel to the incident light source when the direction of the incident light is at an angle away from the normal to the security device, characterised in that,*
(e) *the security device having at least one second region in which the reflection layer is absent,*
(f) *said first and second regions defining indicia.*

Claim 1 according to the second auxiliary request comprises features **(a)** to **(f)** and the following features:

(g) *and the security device further comprising a carrier substrate,*

(h) *wherein the one first region strongly reflects light substantially back to the light source when the incident light source is substantially parallel to the normal of the substrate, and*
(i) *the light deflection structure comprises a prismatic structure.*

Claim 1 according to the fifth auxiliary request comprises features **(a)** to **(g)** and the following features:
(j) *wherein the light deflection structure is partially applied to one surface of the carrier substrate leaving one or more regions of the carrier substrate uncovered by the light deflection structure and*
(k) *at least one of said uncovered regions of carrier substrate is covered by the reflection layer.*

Claim 1 according to the sixth auxiliary request has the following wording:
A security device comprising a carrier substrate and a light deflection structure applied to said carrier substrate, the light deflection structure comprising facets and having a first side and a second opposing side,
a colourshifting layer applied to the first side of the light deflection structure and
a reflection layer applied to at least a first region of the second side of the light deflection structure so as to provide a strong reflection in a direction substantially parallel to the incident light source when the direction of the incident light is at an angle away from the normal to the security device,
the security device having at least one second region in which the reflection layer is absent,
said first and second regions defining indicia,
wherein the one first region strongly reflects light

substantially back to the light source when the incident light source is substantially parallel to the normal of the substrate, and
wherein the light deflection structure comprises an array of parallel linear mircoprisms [sic] in which the facets make an angle of 45 degrees with a surface of the substrate and wherein the angle between adjacent facets is 90 degrees.

VI. The parties' relevant arguments are discussed below.

Reasons for the Decision

1. The appeal is admissible.

2. The invention concerns a security element comprising three sub-parts: a colourshifting layer, a light deflection structure and a reflection layer (e.g. a metallic layer) covering a first region of the light deflection layer, wherein in at least a second region the reflection layer is absent. The first and second regions define indicia (see e.g. figures 2 and 4 of the patent). The partially metallised deflection structure (and possibly the colourshifting layer) provide desired optical effects.

3. Main request (patent as granted)

3.1 The opposition division held that document D1 disclosed features (a) to (c), (e) and (f), but failed to disclose feature (d), see point 3.1.1 of the impugned decision.

Figure 6 of D1 was considered only schematic, so that the function of parts of the reflective layer (i.e. its plane structures) taken independently could not be

derived therefrom. When referring to the description corresponding to figure 6, namely to paragraph [0084], the only function disclosed was that of a diffractive pattern. With a diffractive pattern, when the direction of the incident light was at an angle away from the normal to the security device, a reflection was provided at angles which were not in a direction "substantially parallel to the incident light source". In order to fulfil the function of a diffractive pattern, the reflective layer could therefore not reflect light according to feature (d).

3.2 The appellant argued that the opposition division wrongly interpreted feature (d). Feature (d) did not require that a strong reflection must be produced for any incident light impinging on the light deflection structure at *any* angle. An embodiment in the prior art took away novelty if light was incident at *one* angle away from the normal to the security device and produced a "strong" reflection in a direction parallel to the direction of incident light (i.e. "in a direction substantially parallel to the incident light source").

Furthermore, claim 1 or the patent as a whole did not define when a reflection was "strong" and when not. No clear definition was given in the patent, especially not in paragraphs [0021] and [0022]. The embodiment shown in figure 12 presented a reflection in all directions with no peak of maximum brightness. The structure shown in figure 1 of the patent provided a visible reflection also for angles other than the one corresponding to arrow (b). Thus, any visible reflection might be considered strong.

For the appellant, the last sentence of paragraph [0015] of the patent stated that a "strong" reflection was achieved when a reflective coating 14 was present on facets or lenses of a deflection structure 12.

The wording of feature (d) would exclude only a perfectly planar reflection layer (e.g. a flat mirror), which would not provide reflected light back to the light source when the direction of incident light was at an angle away from the normal to the security element. A perfectly flat mirror would only present a specular reflection. Any other non-flat surface would provide a "strong" reflection in the sense of feature (d).

According to the appellant, the above considerations justified a broad interpretation of the wording of claim 1.

As to the disclosure of features (a) to (c), (e) and (f) in D1, the appellant referred to point 3.1.1 of the impugned decision. In figure 6 of D1, the normal to the security element was perpendicular to the element 32.

Figure 6 of D1 disclosed an embossing pattern having facets or flanks with valleys and peaks and thus forming a prismatic structure. As figure 6 of D1 did not disclose a perfectly flat mirror, a "strong" reflection in the sense of feature (d) would be the consequence of the lacquer layer 62 being embossed.

Moreover, when the direction of incident light was perpendicular to the planar structure of reflection layer 66 (made of e.g. metal), i.e. at an angle with said normal to the security element, it would be reflected in a parallel way back to the light source

(see the statement setting out the grounds of appeal, page 4, first paragraph), which corresponded to a reflection of the planar portions of reflection layer 14 of figure 1 of the patent (illustrated by arrow "b"). A "strong reflection" was any reflection that could be observed or measured. A reflection according to feature (d) was produced even if the angle between the facets in D1 and the normal to the security device was different from 45°, as exemplified in figure 1 of the patent. Figure 6 of D1 showed that the reflection layer 66 had several valleys formed by descending and ascending flanks, each of them implying an angle for which the effect according to feature (d) was obtained. To conclude that D1 disclosed (d), it was sufficient that for one angle the conditions of feature (d) were fulfilled.

The appellant pointed out that paragraph [0084] of D1 disclosed that the embossing pattern 64 in figure 6 was not necessarily a diffraction pattern ("Thereafter, a desired embossing pattern, e.g. a diffraction pattern, is embossed in the embossing lacquer layer 62 ..."). Even in the case of a diffraction pattern, feature (d) would be anticipated by figure 6 of D1 in the first order of diffraction if the path difference is exactly one wavelength, see the appellant's letter dated 22 July 2021, section 2. Using D11, figure 12.1, the appellant argued that the first order reflection would fulfil the condition of feature (d), when the light was incident at an angle of $\alpha/2$, α being the angle between the zero-order and first-order reflection.

Feature (d) was thus disclosed in D1.

3.3 The respondent argued that the appellant questioned the clarity of the claims and, as clarity was not a ground

of opposition, its comments should not be considered.

Paragraphs [0021] and [0022] of the patent ("the reflective (coated) regions 15 appear very bright even in poor lighting conditions", "the security device 10 is optimised to exhibit maximum brightness ... where there is a light source substantially parallel to the viewing direction") made clear what was meant by "strong reflection". Paragraph [0022] taught that the security element exhibited a "peak of maximum brightness" for the reflective regions 15 at viewing condition (b). The brightness at viewing condition (b) was noticeably greater than in other directions. For example, the embodiment of figures 1 and 7 had two peaks of maximum brightness. The arrangement of figure 12 had also a peak of brightness, when the lenses had "steep sides". Paragraphs [0021] and [0022] made it clear that light "viewed" by a human observer was meant, and not light measured by any instrument. Feature (d) required that the "strong reflection" must be provided in a specific direction, namely "substantially parallel to the incident light source", when the light incident was at an angle away from the normal.

There was no explicit disclosure of feature (d) in D1. For feature (d) to be deemed to be implicitly disclosed, it must be directly and unambiguously derivable from the content of D1. Reference was made to the Case Law of the Boards of Appeal, 9th Edition, 2019, I.C.4.3.

The respondent agreed with the opposition division in that figure 6 was a purely schematic representation that could not be used to make assumptions how light would be reflected from the embossing pattern. As

stated in decision T 1148/12, schematic figures did not allow the skilled person to clearly and unmistakably derive features therefrom (see also Case Law of the Boards of Appeal, 9th Edition, 2019, II.E.1.13, ninth paragraph). It was not possible to determine the shape of the light deflection structures nor their effect on the behaviour of light from figure 6 of D1. Element 64 in figure 6 simply indicated the presence of a diffraction pattern, but not an array of planar facets.

As the structure shown in figure 6 of D1 was a diffraction pattern (see paragraph [0084], first sentence), which split and diffracted light into several beams travelling in different directions (see the figure in the respondent's reply to the statement of grounds of appeal), a reflection according to feature (d) was not produced. The directions of the beam depended on the spacing of the grating (i.e. the pitch of the grooves) and the light's wavelength. Using the above interpretation of "strong reflection", a typical diffraction pattern would not satisfy feature (d) of claim 1, that being the reflection of light by the light deflection structure in a direction substantially parallel to the incident light source, observable by a viewer as a peak of maximum brightness, when the direction of incident light is at an angle away from the normal to the security device.

Section 12.3 of D11 (page 270, first paragraph) disclosed that "first-order gratings are typically designed such that the viewed first diffraction order emerges roughly normal to the device surface", in contrast to what was required by feature (d). Figure 12.1(a) of D11 showed that, if light was incident at an angle away from the normal to a security element, light was not reflected as required by claim 1. Neither light

diffracted into the zero order nor light diffracted into the first order met the conditions of feature (d).

3.4 The Board is of the view that a security element according to claim 1 as granted is known from D1 so that the subject-matter of claim 1 lacks novelty (Article 52(1), 54(1) and (2) EPC). The reasons are the following.

3.4.1 It is common ground that, according to the Enlarged Board of Appeal's decision G 3/14 (OJ EPO 2015, 102, Catchword), the claims of the patent as amended may be examined for compliance with the requirements of Article 84 EPC only when, and then only to the extent that the amendment introduces non-compliance with Article 84 EPC.

In the present case, any allegedly unclear feature of the claims as granted cannot be examined for compliance with Article 84 EPC. However, for the sake of a meaningful comparison with the prior art, it has to be established how the claimed features - in particular, feature (d) - are to be understood by a skilled person.

3.4.2 The Board is of the view that features (c) and (d) of claim 1 define that applying the reflection layer on the first region provides a "strong reflection" of light in a direction which is parallel to the direction of incident light, i.e. "in a direction substantially parallel to the incident light source". The direction of incident light is at an angle away from the normal to the security device. As argued by the appellant, in order to conclude that a given security element according to the prior art satisfies feature (d), it is sufficient that said security element is arranged such that, when light is incident at least one angle θ_{in}

away from the normal to the security element, a "strong" reflection in a direction parallel to the incident light is observed. Claim 1 does not exclude that a "strong" reflection is observable for more than one of such angles or even for any angle θ_{in} of light incidence.

3.4.3 The Board is not persuaded that the term "strong reflection" necessarily implies a "peak of brightness" as argued by the respondent, i.e. that a reflection of light of a high intensity can be observed for the angle according to feature (d), whereas the intensity is lower when said observation angle is increased or decreased.

The respondent's definition of "strong reflection" might be accurate for the specific case of an array of linear microprisms 17 with facets 18 and with a reflective layer 14 as shown in figures 1 and 7 and described in paragraphs [0021] and [0022] of the patent. Claim 1 is however not limited to this particular arrangement and there is no indication in the patent that the respondent's definition of "strong reflection" is applicable to any other deflection structure. For example, the Board has doubts whether the deflection structure 12 shown in figure 12 of the patent and comprising an array of lenticules (see paragraph [0044] or claim 11 as granted ("lenticular structure")) would produce any peaks of brightness.

As pointed out by the appellant, paragraph [0015] of the patent brings the term "strong" reflection into connection with the presence of a reflective coating. In other words, a portion of the light deflection structure provided with a reflective coating has a higher reflection (i.e. a "strong" reflection) than

another portion without any reflective coating. This interpretation appears to be in line with paragraph [0035] of the patent, which states that the metallised indicia "have a strong reflecting bright appearance" in contrast to the "duller" non-metallised background.

The Board accepts the respondent's view that the "strong reflection" is to be viewed by a human observer, as the patent mainly describes security elements to be observed by the naked eye. In view of the above, however, the term "strong reflection" has a broad meaning and refers to a reflection of any observable light intensity.

3.4.4 Turning to document D1, both parties agree with the opposition division that D1 discloses features (a) to (c), (e) and (f): security device (figure 6), light deflection structure (embossing pattern 64), carrier substrate (62), colourshifting layer (34), reflection layer (66). The Board does not see any reason to disagree.

The Board notes that according to paragraphs [0015] and [0016] of the patent a light deflection structure can be the embossed surface of a carrier substrate. Thus, the embossing pattern 64 at the surface of embossing lacquer layer 62 in D1 is a light deflection structure.

According to paragraph [0084] of D1, the metal reflective layer 66 on first portions of the light deflection structure 64 and the demetallized gaps 68 (which are second regions in which the reflection layer is absent) provide an "inverse lettering", i.e. define indicia.

3.4.5 As argued by the appellant, the surface of lacquer layer 62 in D1 is embossed (i.e. not flat) and has a metallic reflective layer. When light impinges on said non-flat surface of said reflective layer 66 at an angle of incidence $\theta_{in} > 0°$, a "strong" light reflection - see section 3.4.3 above - will be visible at an observation angle $\theta_r = \theta_{in}$. Feature (d) is thus disclosed in D1 for an embossed pattern.

3.4.6 The Board agrees with the respondent that figure 6 is a schematic drawing, which is obviously not at scale, and that not every detail of the deflection structure can be derived therefrom. For example, a skilled person would not be able to determine the pitch of the embossing pattern or the exact angle between two adjacent surfaces.

However, the content of figure 6 cannot be ignored. The skilled person would understand from figure 6 in combination with paragraph [0084] that the embossing pattern 64 has planar facets (or "flanks"), which form a same angle away from the normal to the security element and which are partially covered by a reflective layer 66. The embossing pattern is not necessarily a "diffraction pattern" (see paragraph [0084]: "a desired embossing pattern, e.g. a diffraction pattern", and see paragraph [0033] mentioning other possible examples for the embossed structure: "optically active microstructure", "matte pattern", "arrangement comprising microlenses", "arrangement comprising micromirrors"). In this respect, the Board shares the appellant's view.

In the case of figures 1, 3 or 9a of the patent showing a light deflection structure 12 with planar facets and reflection layer 14, the incident light and the "strong

reflection in a direction substantially parallel to the incident light source" are illustrated by arrows (b). The skilled person understands that this configuration is obtained when the direction of the incident light is perpendicular to a facet covered by the reflective coating 14 (see paragraph [0021] of the patent: "When the security device 10 is viewed off-axis, such that the viewing angle is perpendicular to one of the facets 18 (condition (b)) and a light source is positioned substantially parallel with the viewing direction [...], the reflective (coated) regions 15 appear very bright even in poor lighting conditions.").

Similarly, as argued by the appellant, when light is perpendicularly incident on a flat facet of the reflective layer 66 of D1, i.e. at an angle with the normal to the substrate foil 32, an observable amount of light will be reflected in a direction parallel to the one of the incident light. In other words, the structure shown in figure 6 of D1 will function in the same way as the one shown e.g. in figures 1 or 3 of the patent (arrows (b)). Feature (d) is thus disclosed for the embossed pattern of figure 6 of D1.

3.4.7 Even in the case that the embossing structure 64 is a diffraction pattern, the condition required by feature (d) is met. The splitting and diffraction of the incident light beams mentioned by the opposition division and the respondent are observed when the light is incident at an angle with the normal to the flat facets of the reflective layer 66, e.g. in the case when light is perpendicularly incident on the substrate 32. The wording of claim 1 does not exclude that the deflection structure is a diffraction pattern or functions as a diffraction structure in the way described by the respondent. As a "strong" reflection

is observed when light perpendicularly impinges on the planar facets shown in figure 6 - see section 3.4.6 above -, feature (d) is disclosed even for a diffraction pattern 64.

The Board also accepts the argument provided by the appellant during the oral proceedings that, in case of a diffraction pattern, the angle of light incidence θ_{in} can be chosen such that the first-order reflection is reflected back to the light source.

3.4.8 A "peak of brightness", i.e. a "strong reflection" according to the respondent, is observed when light is perpendicularly incident on planar facets as shown in figure 1 and as described in paragraph [0022] of the patent. According to the considerations in section 3.4.6 above, the planar facets shown in figure 6 of D1 apparently provide a "peak of brightness" in a similar way as shown in figure 1 of the patent and thus produce a "strong reflection" even according to the respondent's own definition of this term.

3.4.9 From the above, it follows that the skilled person would directly and unambiguously derive feature (d) from the content of D1.

Features (a) to (f) being disclosed in combination in D1, the subject-matter of claim 1 as granted lacks novelty.

4. Remittal to the opposition division for further prosecution

4.1 In section 6.5 of its letter dated 17 September 2021, the respondent requested that, should its main request be rejected, the case be remitted to the opposition

division for discussion of the auxiliary requests. It would be procedurally unfair for the respondent, and would advantage the appellant, for the only full examination of the auxiliary requests to occur at the oral hearing before the Board. The respondent would arrive at the hearing without any guidance from the EPO regarding the auxiliary requests (with respect to Article 123(2) EPC and other formalities requirements). Had one or more of the auxiliary requests been considered at first instance, the respondent would be in a position to have convergent requests.

4.2 The appellant objected to a remittal to the opposition division for further prosecution, which would delay the procedure and might result in an undesired "ping-pong effect" between the boards of appeal and the opposition division. It referred to Article 11 RPBA 2020, which aimed at avoiding this effect. All issues related to the auxiliary requests could be dealt with during the oral proceedings before the Board without undue burden (see also T 1531/16). The first to fifth auxiliary requests were filed at the last moment prior to the oral proceedings before the opposition division; this late filing implied that the appellant could take position in writing only during the appeal proceedings, but did not prevent the respondent from filing convergent auxiliary requests.

4.3 As also admitted by the respondent (see its letter dated 17 September 2021), point 6.5, it is the Boards' settled case law that Article 111(1) EPC does not imply an absolute right to have an issue decided on at two instances (see also Case Law of the Boards of Appeal, 9th edition, 2019, V.A.7.2.1). In the present case, the Board takes the view that the auxiliary requests could be dealt with without any undue burden and that there

are no special reasons within the meaning of Article 11 RPBA 2020. In particular, the auxiliary requests result in substance from a combination of dependent claims as granted so that their submission does not alter the legal and factual framework of the respondent's main request.

Exercising the power conferred by Article 111(1) EPC, the board decided, therefore, not to remit the case to the opposition division for further prosecution.

5. Second auxiliary request

5.1 Rule 80 EPC

5.1.1 In section 5 of its letter dated 22 July 2021, the appellant argued for the first time that the second auxiliary request contravened Rule 80 EPC, because independent device claim 1 was a combination of granted claims 1, 2, 10 and an element of the description and independent device claim 4 was a combination of granted claims 1, 2 and 6. Reference was made *inter alia* to T 2063/15 and T 1764/17. During oral proceedings, the appellant justified this late objection by the fact that it was only recently that it had become aware of these decisions, which supported its case. At the date of its reply (10 April 2019) to the respondent's letter dated 17 September 2018, the decisions had not yet been published.

5.1.2 The respondent requested not to take into account the appellant's late-raised objection, and argued that the presence of two independent claims was occasioned by the grounds of opposition. Reference was made to the Case Law of the Boards of Appeal, 9th Edition, 2019, IV.C.5.1.5b.

5.1.3 The appellant's objection under Rule 80 EPC was first raised after the Board's notification of the summons to oral proceedings and constitutes an amendment to the appellant's appeal case, which is subject to the Board's discretion under Article 13(2) RPBA 2020 in combination with Article 25(1) RPBA 2020.

The Board is of the view that there are no exceptional circumstances justified by cogent reasons that prevented the appellant from bringing forward its objections under Rule 80 EPC at an earlier stage of the proceedings. The second auxiliary request was first filed during the opposition proceedings, without any such objection raised by the appellant. It was also filed again with the respondent's reply to the appeal. The appellant could and should have raised this objection in its letter dated 10 April 2019, where it submitted its objections against the respondent's auxiliary requests. The decisions of the boards of appeal referred to by the appellant relate to circumstances different from the ones here. They do not affect the legal and/or factual context of the case at issue so that no exceptional circumstances within the meaning of Article 13(2) RPBA 2020 could be acknowledged. The Board thus decided during oral proceedings not to take into account the appellant's objection under Rule 80 EPC (Article 13(2) RPBA 2020 in combination with Article 25(1) RPBA 2020).

5.2 Novelty - Articles 52(1), 54(1) and (2) EPC

5.2.1 The appellant argued that D1 did disclose a carrier substrate (feature (g)); see figure 6, substrate foil 32. The patent did not define what a "prismatic structure" was; only reference sign 17 and figure 13 of

the patent concerned a prismatic structure. A prismatic structure did not necessarily have an angle of 90° between adjacent facets. Figure 6 of D1 disclosed a prismatic structure in the sense of feature (i). When light impinged on the security element of D1 from the top, the zero-order diffraction was visible so that D1 also disclosed feature (h).

5.2.2 The respondent argued that a prismatic structure was "a transparent optical element with flat, polished surfaces that refract light and at least two of the flat surfaces must have an angle between them", as could be seen in figures 7, 10 and 11 of the patent. A prism had a constant cross-section and extended longitudinally. Figures 8 and 12 of the patent did not show embodiments falling under the scope of claim 1 according to the second auxiliary request.

Figure 6 of D1 merely disclosed a cross-sectional view. The structure shown was not prismatic.

As to feature (h), paragraph [0015] of the patent disclosed that deflection structures with facets or lenses were arranged to achieve the desired effect (see figure 1, arrows (a) and (b)), but did not disclose that said effect was produced for all deflection structures having facets or lenses. Paragraph [0023] of the patent gave a more specific example. Since feature (h) implied a strong reflection in the sense of peak of brightness observable by a viewer, feature (h) was not disclosed in D1. Moreover, D11 showed that first-order and zero-order microstructures required different grating periods.

5.2.3 The security devices according to D1 include a carrier substrate in the sense of feature (g), see figure 6,

lacquer layer 62 or substrate foil 32. This point was not contested by the respondent.

For the reasons given in section 3.4.6 above, figure 6 in combination with paragraph [0084] of D1 show a transparent optical element (embossing pattern of 64) with flat, polished surfaces ("facets" or "flanks") that refract light (paragraph [0084], "diffraction pattern") wherein at least two of the flat surfaces must have an angle between them (figure 6). The embossing pattern 64 also extends longitudinally into the plane of figure 6, as it is a three-dimensional object. The Board does not share the respondent's view that a prismatic structure in the sense of the patent has a constant cross-section while extending longitudinally. While this might be correct for the specific example of the array of linear microprisms 17 shown in figures 7, 10 and 11, paragraph [0043] of the patent or page 18, lines 6 to 12 of the published application make it clear that other arrangements are possible and that e.g. the square pyramids shown in figure 8 form a (micro)prismatic structure. The respondent's argument that paragraph [0043] of the patent erroneously refers to a prismatic structure does not convince the Board.

Considering the above, the Board is of the view that figure 6 of D1 shows a "prismatic structure" in the sense of feature (i).

Regarding feature (h), the term "strongly reflects light substantially back to the light source" does not necessarily imply any "peaks of brightness" for the same reasons given for feature (d) of claim 1 as granted. This expression is to be interpreted broadly and means that reflected light is visible to an

observer. As a consequence, the Board follows the appellant's view that for the security element of D1 this condition is met. In particular, in case of a diffractive pattern, the zero-order reflection is visible when the direction of incident light is parallel to the normal to the substrate.

Features (a) to (i) being disclosed in combination in D1, the subject-matter of claim 1 according to the second auxiliary request lacks novelty (Article 52(1), 54(1) and (2) EPC).

6. Fifth auxiliary request

6.1 In its letter dated 10 April 2019, the appellant argued that the subject-matter of claim 1 of the fifth auxiliary request lacked an inventive step for the same reasons given for claim 4 of the first auxiliary request then on file, see section III.5 and III.1, last paragraph.

The appellant referred to document D4, which concerned security elements (page 5, lines 1 to 6) and disclosed in figures 3, 5 and 6 a reflection layer 15 extending on portions not being part of a light deflection structure. Paragraph [0033] of D1 was also discussed in the context of inventive step, see said letter page 4, last paragraph.

The appellant, thus, argued that the objection of lack of inventive step against the fifth auxiliary request in its letter of 22 July 2021 was not a new, late-filed line of attack. It was not an amendment to its case but only a further explanation of the already submitted objections.

In sections 3., 4.2 and 4.3 of its letter dated 22 July 2021 and during the oral proceedings, the appellant provided a more detailed reasoning. According to paragraph [0084] of D1, the embossed pattern 64 could be a diffraction pattern; this was only a possible example. Other alternative patterns were mentioned in paragraph [0033], e.g. microlenses. In the latter case, the problem would be to choose a suitable lens array. In order to implement an array of microlenses, a skilled person using their common general knowledge would use spherical microlenses. An arrangement of spherical microlenses forming the deflection structure would imply flat spaces between them. The appellant noted that claim 1 of the fifth auxiliary request did not require any specific dimension of the parts of the substrate covered by the reflection layer. As illustration, the appellant referred to figures 2b and 3 of D4 showing microlenses 116, said flat spaces and a metallic layer 15 thereon. When implementing spherical microlenses in view of paragraph [0033] of D1, the skilled person would, thus, arrive at a device having features (j) and (k).

6.2 The respondent argued that the appellant's arguments brought forward in its letter dated 22 July 2021 constituted an amendment of the appellant's appeal case that should not be admitted into the proceedings under Article 13(2) RPBA 2020.

Moreover, claim 1 of the fifth auxiliary request was directed at the arrangement of figures 9a to 9c of the patent showing that some portions of the carrier substrate comprised the light deflection structure and other portions did not. The technical effect of features (j) and (k) was to improve the security

element by producing a different visual effect at a normal viewing angle and at an oblique viewing angle. None of the documents on file showed features (j) and (k).

The respondent further argued that the appellant only speculated that the microlenses of paragraph [0033] of D1 would have intermediate flat areas between the lenses. Figures 3, 5 and 6 of D4 illustrated a microstructure arrangement (16, 46, 56) that was applied on the entire surface of the carrier substrate (18, 48, 58), this microstructure arrangement being the light deflection structure. The spacing and size of the microlenses as disclosed in page 17, lines 22 to 24 of D4 would not achieve the optical effects provided by features (j) and (k), as they were below the resolution of the human eye. Moreover, the combination of lens layers 12 and 16 of D4 was essential for the function of this security element and incompatible with the one of D1. The array of microlenses 12 would not have flat parts between the microlenses.

6.3 The Board accepts that the appellant's submissions in its letter dated 22 July 2021 are additional explanations to its objection raised in the letter dated 10 April 2019 and that they do not, therefore, constitute an amendment to its appeal case. Hence, the question of their admission into the appeal proceedings under Article 13 RPBA 2020 does not arise.

6.4 According to the respondent, claim 1 of the fifth auxiliary request was directed at the example shown in figures 9a to 9b of the patent and the related description (i.e. paragraphs [0039] to [0040]). According to this part of the patent specification, features (j) and (k) provided the effect shown in

figures 9b and 9c and described in paragraph [0040] of the patent.

Both parties assumed that the regions uncovered by the deflection structure and covered by the reflection layer are on the surface of the carrier substrate where the deflection structure is "partially applied to". However, the wording of claim 1 does not specify this arrangement. Claim 1 defines neither the exact locations of the "uncovered regions" of the carrier substrate "covered by the reflection layer" nor their dimension(s). The regions of the carrier substrate covered by the reflection layer can be positioned anywhere on the carrier substrate and can be too small to be seen by the human eye. The Board is therefore not convinced that the effects disclosed in the patent in relation to the examples of figures 9a to 9c are actually achieved by features (j) and (k), contrary to what the respondent argued.

Starting from the security element of figure 6 of D1 in combination with the microlenses mentioned in paragraph [0033], as stated by the appellant, features (j) and (k) relate to the problem of how to implement said microlenses.

Microlenses of spherical shape were generally known before the priority date of the patent. The board considers that, for the skilled person tasked with the implementation of microlenses in the deflection stucture of the security device of D1, spherical microlenses would be the obvious - if not standard - choice.

When embossing the lacquer layer 62 according to paragraph [0084] of D1 to form an arrangement of

spherical microlenses in view of paragraph [0033], the skilled person would arrive at a plurality of spherical microlenses separated by flat portions between microlenses, as illustrated for layer 16 in figures 2b and 3 of D4. When arranging spherical (micro)lenses next to each other, the presence of flat areas (portions) among them is geometrically inevitable.

In the Board's view, the plurality of microlenses together form the deflection structure. The flat portions among them are not parts of the deflection structure, but are parts of the carrier substrate (lacquer layer 62) not covered by the deflection structure. This corresponds to what is shown in figure 9a of the patent: items 15 have been embossed in the surface of carrier substrate 11 and form the deflection structure, whereas regions 16 are the uncovered portions. In other words, when using spherical microlenses as the deflection structure of D1, the light deflection structure (64) is partially applied to one surface of the carrier substrate (62) leaving one or more regions of the carrier substrate (62) uncovered by the light deflection structure (64).

When applying reflective metal layer 66 onto lenticular features (i.e. the microlenses) of the deflection structure as shown in figure 6, the metal layer would necessarily cover at least one of the flat portions of the carrier substrate.

From the above, it follows that, when the skilled person implements the microlenses of paragraph [0033] of D1 as spherical microlenses (which itself is an obvious choice), they would arrive at a security element having features (j) and (k) of claim 1.

Thus, the subject-matter of claim 1 of the fifth auxiliary request does not involve an inventive step (Article 56 EPC) in view of D1 and the common general knowledge of the skilled person. Figures 2b and 3 of D4 only provide an illustration to better understand the appellant's argument.

7. Sixth auxiliary request - admission

7.1 The respondent acknowledged that the filing the sixth auxiliary request represented an amendment to its case. It explained that the request was filed in reaction to the Board's "literal interpretation" of figure 6 of D1, which was different from the interpretation by the opposition division. The sixth auxiliary request could be dealt with without undue burden and was convergent with the second auxiliary request and should therefore be admitted into the proceedings.

7.2 The appellant requested that the sixth auxiliary request not be admitted into the appeal proceedings, as it was only filed after the Board's summons to oral proceedings. Moreover, claim 1 of the sixth auxiliary request was not convergent with the higher-ranking fifth auxiliary request, but further defined the prismatic structure according to the second auxiliary request by adding features from the description, which the appellant had no opportunity to search in the state of the art for. Said second auxiliary request and the prismatic structure were discussed on page 11 of the statement setting out the grounds of appeal so that the sixth auxiliary request could have been filed with the respondent's reply to the appeal dated 17 December 2018.

7.3 The respondent's sixth auxiliary request was filed after the notification of the summons to oral proceedings and constitutes an amendment to the respondent's appeal case, which is subject to the Board's discretion under Article 13(2) RPBA 2020 in combination with Article 25(1) RPBA 2020.

In its communication pursuant to Article 15(1) RPBA 2020, the Board expressed a preliminary view different from the opposition division's conclusions and in line with the appellant's interpretation of the content of document D1.

The respondent had to expect that the Board might express a preliminary opinion that would be different from the opinion of the opposition division. In particular, the respondent had to expect that there was always a possibility that the Board disagreed with the conclusions in the impugned decision and adopted the view of the appellant as presented in the statement of the grounds of appeal. The respondent had a duty to react to the arguments brought forward by the appellant without waiting for the Board to express its preliminary opinion, especially since this preliminary opinion did not contain any arguments or objections that were not already known to the respondent.

Thus, the Board cannot identify any exceptional circumstances that could justify the filing of the sixth auxiliary request at this stage of the appeal proceedings. Hence, the sixth auxiliary request is not taken into account (Article 13(2) RPBA 2020 in combination with Article 25(1) RPBA 2020).

8. As the subject-matter of claim 1 as granted lacks novelty (Articles 100(a), 52(1), 54(1) and (2) EPC)

over the disclosure of D1 and none of the respondent's auxiliary requests taken into account by the Board meets the requirements of the EPC, the patent must be revoked.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

S. Sánchez Chiquero M. Papastefanou

Decision electronically authenticated