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# Datasheet for the decision of 18 January 2017

**Case Number:** T 1632/13 - 3.2.05

**Application Number:** 10179378.4

**Publication Number:** 2263807

**IPC:** B05D5/06, B05D3/14

**Language of the proceedings:** EN

**Title of invention:**
Method and apparatus for orienting magnetic flakes and image obtained by said method

**Applicant:**
Viavi Solutions Inc.

**Relevant legal provisions:**
EPC Art. 54(1)

**Keyword:**
Novelty (yes)
Remittal to the department of first instance (yes)

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**Case Number: T 1632/13 - 3.2.05**

# D E C I S I O N
# of Technical Board of Appeal 3.2.05
# of 18 January 2017

| | |
|---|---|
| **Appellant:** (Applicant) | Viavi Solutions Inc.<br>430 N. McCarthy Boulevard<br>Milpitas, CA 95035 (US) |
| **Representative:** | Keith William Jones<br>Murgitroyd & Company<br>Scotland House<br>165-169 Scotland Street<br>Glasgow G5 8PL (GB) |
| **Decision under appeal:** | **Decision of the Examining Division of the European Patent Office posted on 23 January 2013 refusing European patent application No. 10179378.4 pursuant to Article 97(2) EPC.** |

**Composition of the Board:**

| | |
|---|---|
| **Chairman** | M. Poock |
| **Members:** | O. Randl |
| | G. Weiss |

## Summary of Facts and Submissions

I. This appeal lies against the decision of the examining division to refuse the divisional application No. 10 179 378.4.

The division reached the conclusion that the subject-matter of claim 1 lacked novelty over the disclosure of document D1 (EP 0 556 449).

II. Oral proceedings before the board took place on 18 January 2017.

III. The appellant requested that the decision under appeal be set aside and that a patent be granted with claims according to the main request filed with letter dated 7 November 2012 or in the alternative with the claims amended according to either the first auxiliary request filed with the statement setting out the grounds of appeal or the second auxiliary request filed with letter dated 1 April 2016.

IV. Claim 1 of the main request reads (the feature numbering proposed by the appellant is indicated in square brackets):

"[**1.1**] A substrate comprising an image printed thereon, the image comprising: [**1.2**] a plurality of magnetic pigment flakes surrounded by a transparent carrier printed on the substrate,
characterized in that
[**1.3**] a portion of the plurality of magnetic pigment flakes are aligned in an arching pattern relative to a surface of the substrate, wherein [**1.4**] the arching pattern includes magnetic pigment flakes parallel to

the surface of the substrate in the center portion of the arching pattern,
wherein, [**1.5**] when viewed by an observer, an elongate region of the substrate where pigment flakes aligned in the arching pattern are tilted so that incident light reflects off faces of the magnetic pigment flakes to the observer appears lighter than other areas of the substrate that do not directly reflect light to the observer,
and [**1.6**] the elongate region forms a bright bar across the image appearing between a first contrasting field and a second contrasting field,
wherein [**1.7**] the bright bar appears to move relative to the first contrasting field and the second contrasting field from first to second positions and the sizes of the first and second contrasting fields change as the image is tilted with respect to the viewing angle in the presence of a fixed illumination source."

V. The appellant argued as follows:

(a) Claim interpretation

The interpretation of the word "flake" by the board as expressed in its communication of 23 December 2015 is unduly limiting. A "flake" is a three-dimensional structure.

(b) Novelty

The subject-matter of claim 1 differs from the disclosure of document D1 by features 1.1, 1.2, 1.3, and 1.7.

(i) Feature 1.1

In document D1 the pattern is formed in a paint layer which is formed by spraying. A paint layer is not a printed image. To the extent that an image is formed, it is formed by the magnet. Thus there is no image printed on a substrate in document D1.

The skilled person would have no trouble recognizing whether an image has been printed or painted. For instance, the rolling bar effect is visible on the current 5 and 10 euro banknotes; the skilled person would know that the image has been printed. When an image is printed, ink is applied to an image carrier and then transferred to the substrate, whereas painting means that the paint is applied directly onto the substrate by means of a brush or spray. A printed image is much thinner than a painted layer. Also, the demarcation of the the image is clear when the image is printed, which is not the case for a spray-painted image.

(ii) Feature 1.2

In document D1 the carrier is not printed on the substrate but spray painted from a spray gun.

(iii) Feature 1.3

The flakes in region C of Figure 27C of document D1 are "substantially parallel to the surface of the paint layer" (see page 16, line 31). The flakes in regions B and D of Figure 27C are "oblique or perpendicular to the surface of the paint layer" (see page 16, line 33), so that the regions appear to be black. The description does not support the interpretation of a highly

schematic drawing in Figure 27C as showing "a portion of the plurality of magnetic pigment flakes ... aligned in an arching pattern relative to a surface of the substrate", as required by feature 1.3. The board's provisional opinion to the contrary is based on hindsight.

(iv) Feature 1.7

Even if the skilled person were to interpret the flakes in region C of Fig. 27C as being "aligned in an arching pattern relative to a surface of the substrate", the arching pattern is not such that it fulfils the functional feature according to which "the bright bar appears to move relative to the first contrasting field and the second contrasting field from first to second positions and the sizes of the first and second contrasting fields change as the image is tilted with respect to the viewing angle in the presence of a fixed illumination source". There is no teaching in D1 that such an effect is achieved. Moreover, the thickness of the spray paint coating and the consequent large number of flakes in the coating means that the numeral "1" defined by the contour 221 (see Figure 27A) does not appear to move relative to the black regions B and D as the image is tilted; indeed, through the depth of the layer, there are flakes at all sorts of angles. The sizes of the black regions B and D do not change. When the image is printed, the layer is much thinner; the desired effect is obtained because there are just a few flakes to be aligned.

At least part of the reason for the lack of the effect in document D1 is that the document teaches the use of a magnet having a particular shape and dimensions, having the shape of a numeral "1" (see page 16,

lines 16-18). Such a magnet shape is incapable of achieving the effect recited in feature 1.7 of claim 1.

(c) Inventive step

Document D1 is not an appropriate starting point for the assessment of inventive step, because it does not disclose a printed document.

When asked what would be a more appropriate starting point, the appellant was unable to suggest a document.

When asked what would be the technical effect of the process feature according to which the image and the carrier were painted on the substrate, the appellant explained the effect to consist in that the substrate and image demonstrate a clearly recognisable and distinctive illusive effect which can be mass produced at high speed with identical images. This could not be achieved with the painting method disclosed in document D1.

To use printing instead of paint spraying would not be obvious when starting from document D1, because D1 is concerned with three-dimensional objects which do not lend themselves to printing at all.

(d) Remittal

The appellant expressed its agreement to a remittal of the case to the examining division for further prosecution on the basis of the main request.

## Reasons for the Decision

1. Applicable law

The patent application under consideration is a divisional application filed on 24 September 2010. Its parent application was filed on 1 July 2003. According to the "Notice from the European Patent Office dated 20 September 2007 on implementation of the transitional provisions of the EPC 2000 applicable during the transition from the EPC 1973 to the EPC 2000" (OJ EPO 2007, 504), the date on which a divisional application is filed is decisive in establishing whether it is subject to the filing and formal requirements under the EPC 2000 or those under the EPC 1973; the filing or priority date of the parent application is irrelevant in this connection. Therefore, Articles 54 and 56 EPC (2000) apply in the present case.

2. Claim interpretation

2.1 Feature 2

The word "flake" is not defined in the application; the word as such has a relatively broad semantic range. For instance, "flake" can designate a small flocculent piece, such as a snow flake, or a thin broad piece peeled or split off from the surface of something, such as a flint-flake. Flakes according to claim 1 have to be suitable for being "parallel to the surface of the substrate". Moreover, claim 1 mentions "faces of the magnetic pigment" by which light is reflected. Considering all these aspects, the board has reached the understanding that the flakes under consideration

are three-dimensional objects that necessarily comprise a more or less planar surface.

2.2 Feature 1.5

This feature, according to which "when viewed by an observer, an elongate region of the substrate where pigment flakes aligned in the arching pattern are tilted so that incident light reflects off faces of the magnetic pigment flakes to the observer appears lighter than other areas of the substrate that do not directly reflect light to the observer", is problematic because it defines the claimed substrate by an effect to be obtained in the perception of an undefined observer situated at an undefined position in space. The board understands the feature to mean that the arrangement of the flakes is such that whatever the position of the observer is with respect to the substrate, there are several flakes of the arching pattern that are aligned such that they reflect light (arguably from the fixed illumination source of undefined position, which is mentioned later in claim 1) in the direction of the observer, and that those reflecting flakes are located within an elongate region on the substrate, i.e. a region that is long in proportion to its width.

2.3 Feature 1.6

This feature requires "the elongate region [to form] a bright bar across the image appearing between a first contrasting field and a second contrasting field". It is understood to express the consequence of the arrangement of the flakes mentioned before. Although the feature "bright" is undefined and to some extent unclear, the skilled person would understand that what is meant is that - to the above mentioned observer -

the elongate region appears to be brighter than the adjacent regions.

The appellant argued that the feature implicitly limited the radius of curvature and width of the arching pattern as well as the density of the flakes. The board agrees that the feature allows to exclude extreme values of those variables which, if adopted, would lead to there being no apparent bar.
The technical contribution of this feature appears not to go beyond that.

2.4 Feature 1.7

According to this feature "the bright bar appears to move relative to the first contrasting field and the second contrasting field from first to second positions and the sizes of the first and second contrasting fields change as the image is tilted with respect to the viewing angle in the presence of a fixed illumination source". The feature is a functional feature defining an effect to be obtained rather than the structure of the claimed substrate. It arguably further defines the arrangement of the magnetic flakes: in order to fulfil the claimed function, the flakes have to be arranged such that their tilt angle continuously increases or decreases in a direction perpendicular to the axis about which the image is tilted.

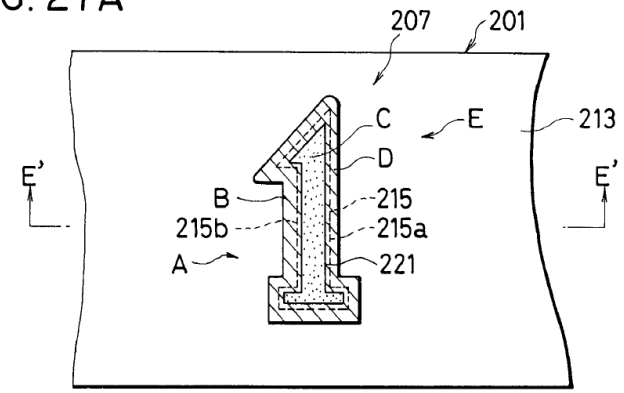
3. Novelty

3.1 Embodiment of Figures 27 of document D1

Document D1 discloses a substrate ("product body") 203, 303 comprising an image (shown on Fig. 27A)

corresponding to the number "1" obtained by alignment of magnetic flakes:

FIG. 27A



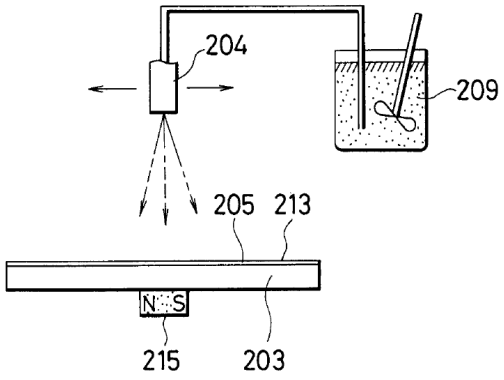

In the following the board examines the four features the disclosure of which was contested by the appellant.

3.1.1 Feature 1.1

(a) Disclosure

The way in which the embodiment of Figure 27 of document D1 is obtained is disclosed on page 16, lines 11-15 and Figure 28.

FIG. 28



Accordingly, a paint mixture 209 containing the magnetic flakes is sprayed onto the product body 203 to form paint layer 205. A magnet 215 is placed below product 203, so that the magnetic flakes in the paint layer 205 are aligned along the magnetic field lines. Consequently, the image cannot be said to have been printed on the substrate within the meaning of feature 1.1.

(b) Relevance

The adjective "printed" is a feature that defines the way in which the image is obtained, i.e. a process feature. According to the established jurisprudence of the boards of appeal, process features can establish the novelty of a claimed product only if they cause it to have different properties from the products previously disclosed (see "Case Law of the Boards of Appeal of the EPO", 8th edition, 2016, item I.C.5.2.7).

The board cannot endorse the appellant's assertion that the skilled person would have no problem distinguishing between a paint layer and a printed image because a printed image is much thinner than a painted layer. The board is aware of painting techniques, such as watercolour painting, that lead to layers of paint, the thickness of which is comparable to the thickness of printed images.

This notwithstanding, the board finds at least plausible that the skilled person would be able to determine that a carrier layer has been applied by printing. Therefore, the board retains this feature as a distinguishing feature.

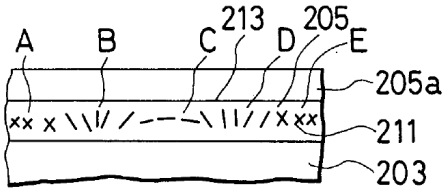
3.1.2 Feature 1.2

As explained in point 3.1.1, the transparent carrier 205 surrounding the magnetic flakes is applied by spray painting. Therefore, it cannot be said to have been printed on the substrate. The reasoning of point 3.1.2 b) above applies by analogy.

3.1.3 Feature 1.3

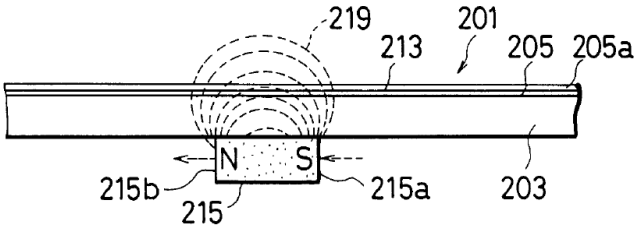
Figure 27C depicts "the typical orientations of the magnetic flakes 211 contained in the paint layer 205" (page 16, line 4).

FIG. 27C



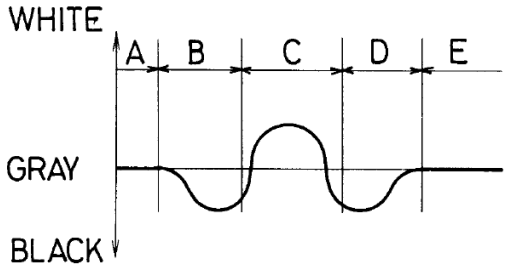

A portion of the plurality of magnetic pigment flakes are aligned in an arching pattern relative to a surface of the substrate. The existence of such an arching pattern is not only based on Figure 27C, which is schematic; it is also to be expected in view of the fact that the flakes are oriented as a result of the application of an appropriate magnetic field such as the one shown in Figure 27B:

FIG. 27B



The arching pattern includes magnetic pigment flakes parallel to the surface of the substrate in the centre portion of the arching pattern. This is also corroborated by the colour diagram shown in Figure 27D:

FIG. 27D




The statement in document D1 that the flakes in region C of Figure 27C of document D1 are "substantially parallel to the surface of the paint layer" (page 16, line 31) and that the flakes in regions B and D of Figure 27C are "oblique or perpendicular to the surface of the paint layer" (page 16, line 33) is consistent with this disclosure. The skilled person would understand that the flakes are oriented parallel to the surface of the paint layer in the centre of region C and that their inclination increases when region B is approached from region C. At some point in region B (corresponding to the minima of the curve depicted in Figure 27D) their alignment is perpendicular to the surface of the paint layer. The transition has to be continuous, and this is also apparent from Figure 27D. The overall pattern, therefore, is an arching pattern.

The appellant criticised the provisional opinion of the board expressed in its communication as flawed, for being based on hindsight. The board disagrees. The

concept of hindsight is relevant in the assessment of inventive step, in particular when considering what the skilled person would have done and whether he would have combined distinct pieces of prior art. When novelty is to be examined, however, there is no other way than to study a prior art document in the light of the invention as it is defined in the claims.

3.1.4 Feature 1.7

The crucial question to be answered by the board is whether the arrangement of flakes disclosed in document D1 would produce the effect described in feature 1.7.

The board agrees with the appellant that there is no explicit disclosure of the effect in document D1. This does not mean, however, that the embodiment depicted in Figures 27 of document D1 does not implicitly contain this feature.

Considering the structural similarity of the embodiment depicted in Fig. 27C with the substrate shown in Fig. 2A of the application under consideration,

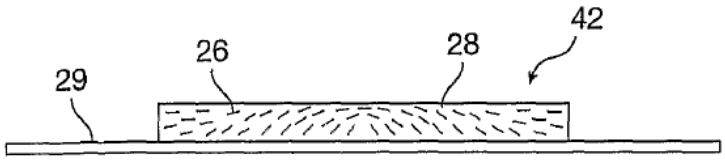



FIG. 2A

it is to be expected that the visual effect experienced by an observer is substantially the same. Thus, when viewed by an observer, an elongate region of the

substrate where pigment flakes aligned in the arching pattern are tilted so that incident light reflects off faces of the magnetic pigment flakes to the observer appears lighter than other areas of the substrate that do not directly reflect light to the observer. The elongate region forms a bright bar across the image appearing between a first contrasting field and a second contrasting field. The bright bar appears to move relative to the first contrasting field and the second contrasting field from first to second positions. The sizes of the first and second contrasting fields change as the image is tilted with respect to the viewing angle in the presence of a fixed illumination source. In other words, those features are implicitly disclosed in the arrangement depicted in Figure 27C of document D1.

The argument that Fig. 27C only shows five flakes in an arching pattern, which is insufficient to form a rolling bar visible to an observer, has not persuaded the board. The same holds true for the argument according to which the figure fails to indicate whether the properties of the arching pattern and ink are adequate for providing an observable moving bar.
The board finds these arguments unpersuasive because the device of Figures 27 is intended to create optical effects in the eye of an observer (see e.g. page 16, lines 6-10), which means that the arrangement and density of the flakes must be adequate for providing an observable picture, which, in view of the particular arrangement of the flakes, corresponds to a bar.

The board is also unable to endorse the view that document D1 teaches a static image. It is true indeed that region C is brighter than regions B and D from a frontal point of view, and that there is a boundary

between the regions, but the situation is somewhat different when viewed from a different point of view. If region B or D is to be understood as the region in which the flakes are arranged perpendicular to the substrate, then this region might remain dark, regardless of the direction of observation, but the transition from the centre of region C (where the flakes are parallel to the substrate) to a region closer to D (where the flakes are inclined with respect to the substrate) would still allow to generate a (possibly limited) moving bar visual effect.

The argument based on the thickness of the layer in document D1 has not convinced the board. It is true that a greater thickness of the carrier layer will lead to greater variations of the flake arrangement, but, as long as the layer is not very thick - as in document D1 - the field lines passing through the carrier layer at different depths will have similar shape and lead to a similar arrangement of the flakes with respect to the surface of the substrate.

The appellant has provided exhibits allegedly obtained with the process according to document D1, showing that no moving bar effect is observable. However, the board, being unable to examine the way in which these exhibits were obtained, cannot take account of this evidence in its assessment of novelty.

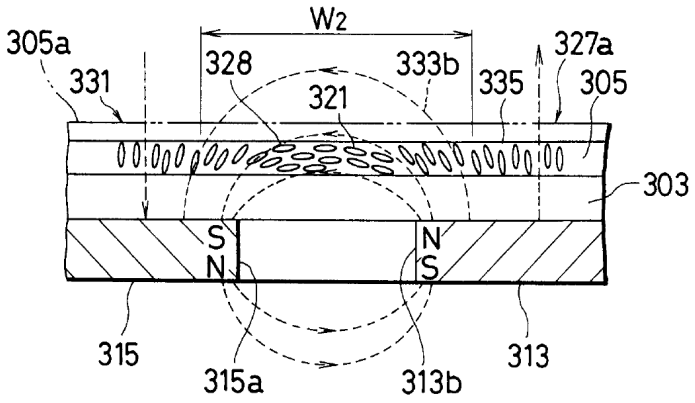
3.1.5 Conclusion

The board reaches the conclusion that the subject-matter of claim 1 is new over the embodiment of Figures 27 of document D1 because this embodiment does not disclose that the image on the substrate and the transparent carrier surrounding the image are printed.

3.2 Embodiment of Figures 35 of document D1

The examining division also found the disclosure related to Fig. 35B of document D1 to be novelty destructive:

FIG. 35B




The board notes that in this embodiment the image and the transparent carrier surrounding it are not printed either. For this reason alone, the embodiment cannot destroy the novelty of the subject-matter of claim 1.

Moreover, the board finds merit in the appellant's argument according to which there is no elongate region. As a matter of fact, the symmetry of the arrangement of the magnets 313 and 315 in Fig. 34:

FIG. 34B

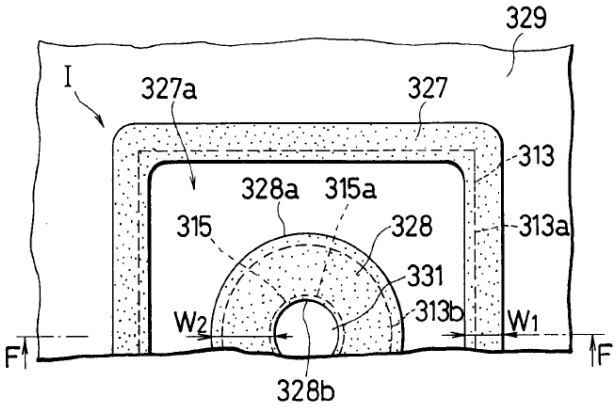
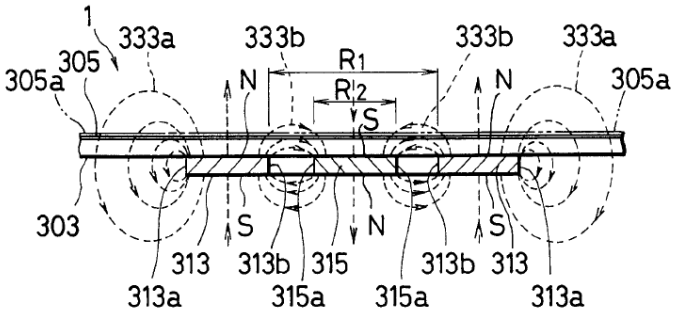



FIG. 34C




would result in a substantially concentric arrangement of flakes of similar arrangement with respect to the substrate and, consequently, in a reflection behaviour that is more complex than a moving bar visual effect.

3.3 Overall conclusion on novelty

The subject-matter of claim 1 is new over the cited prior art.

4. Remittal to the first instance

The examining division refused the application for lack of novelty over document D1 and did not have to examine whether the invention involves an inventive step.

Therefore, the board finds a remittal for further examination to be the appropriate course of action.

The examining division will have to determine whether, in view of the differences established by the board, document D1 is an appropriate starting point for the examination of inventive step.

In case the examining division should find document D1 to qualify as closest prior art, it will have to decide on the technical effect of the sole distinguishing feature.

Before the board, the appellant has argued that this effect consists in that printing (rather than painting) allows the high-speed mass production of substrates comprising images having a rolling bar effect as described in features 1.6 and 1.7.

The board notes, as an *obiter dictum*, that it does not find this argument persuasive. As can be seen from original method claim 32, the originally claimed method involves the following steps: (1) printing a field of magnetic pigment dispersed in a fluid carrier on a substrate, (2) moving the substrate relative to a magnet to selectively orient the magnetic pigment to form the image, and finally (3) fixing the image.
It is not self-evident that this method as such is better suited for high-speed mass production than the method disclosed in document D1. The same holds true for the alternative method defined in original claim 41.

**Order**

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

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance for further prosecution on the basis of the main request.

The Registrar: The Chairman:


D. Meyfarth M. Poock

Decision electronically authenticated