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21 juli 2020

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27 juli 2020

(73) Octrooihouder(s):
Zhangjiagang Kangde Xin Optronics Material Co. LTD te Zhangjiagang City, China, CN

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Jan van der Horst te Veldhoven

(74) Gemachtigde:
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(54) **Autostereoscopic display**

(57) The invention relates to an autostereoscopic display comprising an array of sub-pixels lined with a view altering layer, such as a lenticular lens stack or a parallax barrier,
wherein the view altering layer has a plurality of parallel elongate elements extending in a first direction and wherein the elongate elements are arranged with an element pitch in a second direction perpendicular to the first direction;
wherein the array of sub-pixels has rows of sub-pixels extending in the second direction with the sub-pixels at a fixed sub-pixel pitch;
wherein two subsequent rows of sub-pixels are shifted along the second direction relative to each other over a distance of 1/n-th of the sub-pixel pitch, wherein n = 2, 3, 4, ...;
and wherein the element pitch is m+1/n-th of the sub-pixel pitch, wherein m = 1, 2, 3, ...

NL B1 2022313

Autostereoscopic display

The invention relates to an autostereoscopic display comprising an array of sub-pixels lined with a view altering layer, such as a lenticular lens stack or a parallax barrier,

wherein the view altering layer has a plurality of parallel elongate elements extending in a first direction and wherein the elongate elements are arranged with an element pitch in a second direction perpendicular to the first direction;

wherein the array of sub-pixels has rows of sub-pixels extending in the second direction with the sub-pixels at a fixed sub-pixel pitch.

Such an autostereoscopic display is known from EP 3093704. Typically, with an autostereoscopic display mounted on a wall or positioned on a desk, the first direction is the vertical direction, while the second direction is the horizontal direction.

With this known autostereoscopic display, rows of sub-pixels with a single color are provided. An integer number of sub-pixels is positioned under one elongate element, such that a number of views, corresponding to the integer number of sub-pixels, is obtained.

By providing the subsequent rows of sub-pixels with different colors, such as red, green and blue, multicolored pixels can be provided underneath the elongate element for each view.

When an increase of views is desired, the number of sub-pixels arranged under one elongate element needs to be increased. This however reduces the resolution in the second direction. If for example two views are desired, only half of the pixels in a row can be used to compose a view. If for example four views are desired, only a quarter of the pixels

can be used for a view, so the resolution is only a quarter of the resolution of the display.

With increasing resolution of the displays, the number of views can gradually be increased, while keeping the resolution for a view constant. However, increasing the resolution of a display becomes more difficult as the sizes of the sub-pixels become smaller and smaller.

It is therefore an object of the invention to reduce or even remove the above mentioned disadvantages.

This object is achieved with an autostereoscopic display according to the preamble, which is characterized in that two subsequent rows of sub-pixels are shifted along the second direction relative to each other over a distance of 1/n-th of the sub-pixel pitch, wherein n = 2, 3, 4, …;

and wherein the element pitch is m+1/n-th of the sub-pixel pitch, wherein m = 1, 2, 3, ….

With the autostereoscopic display according to the invention, the number of views is increased by using two or more rows of sub-pixels, which rows are shifted in the second direction, typically the horizontal direction. In this way the number of views can be increased, while maintaining the same resolution of the display and maintaining also the same resolution in the second direction, but the resolution in the first direction will decrease as a result of this invention.

Considering an autostereoscopic display with two sub-pixels under an elongate element, the resolution in the second direction will be 50% of the display, but will be 100% of the display in the first direction. Now by using the invention, a second row of sub-pixels is shifted over half the sub-pixel pitch. The combined two rows now can provide four views, instead of two views. The resolution in the second direction will still be 50% of the display. However, the resolution in the first direction will be decreased to 50% of

the display resolution.

With an autostereoscopic display according to the invention, it will thus be possible to better divide the decrease of resolution in the first and second direction.

The shifting of the rows of sub-pixels has the additional advantage that the moire effect is reduced. Typically some distance is required between the sub-pixels of the rows for accommodating electrical wiring in order to control the sub-pixels (blackmatrix). With the rows of sub-pixels straight under each other, variations in intensities caused by the distance between the sub-pixels results in a moire effect.

Now with the invention, the subsequent rows of pixels are no longer aligned, but shifted, such that the spacing between the sub-pixels of subsequent rows are no longer aligned in the first direction, which at least reduces the moire effect.

In a preferred embodiment of the autostereoscopic display according to the invention the sub-pixels of a row have a single color and the array of sub-pixels has in the first direction a repetitive pattern of rows of sub-pixels of different colors, for example red, green and blue, wherein the adjacent sub-pixels within the repetitive pattern in the first direction compose a pixel.

By combining sub-pixels of different color, a main pixel is composed, which is able to emit a spectrum of colors. As the sub-pixels are arranged in rows of single color, the composed, main pixel will extend in the first direction and therefore be under a single elongate element, such that the composed pixel is used for a single view.

In another embodiment, the different colors for a main pixel are arranged in a fixed pattern over a number of sub-pixels either in the same row or a number of adjacent

rows.

By arranging the different colors in a fixed pattern, the pattern can be optimized for a desired type of autostereoscopic display or for a desired use of such a display.

Preferably, the elongate elements of the view altering layer are elongate lenses of a lenticular lens stack.

In yet another embodiment of the autostereoscopic display according to the invention the edges of each sub-pixel are non-parallel with the first direction.

With the edges of each sub-pixel being non-parallel with the first direction, it is prevented that the edges and therefore the space between the sub-pixels coincides with the first direction. As a result, the moire effect is prevented because in the first direction, the overall intensity will more or less be the same at each position along the second direction. So, with the edges of the sub-pixels being non-parallel with the first direction, no longer lines in first direction with a substantial reduced intensity are present and the moire effect is therefore reduced.

The sub-pixels preferably have a polygonal shape, such as a hexagonal shape. The polygonal shape allows a compact nesting of the sub-pixels, while the edges are non-parallel with the first direction.

In a further embodiment of the autostereoscopic display according to the invention each sub-pixel has a trapezoid shape with the parallel sides of the trapezoid shape parallel to the second direction and wherein the shape of successive sub-pixels in the second direction are mirrored over both the first direction and the second direction.

With the shape being trapezoid and having the shape mirrored for each alternating sub-pixel a very compact packing of the sub-pixels is obtained, while keeping the edges

nonparallel to the first direction.

In a very preferred embodiment of the autostereoscopic display according to the invention each sub-pixel has an isosceles trapezoid shape.

These and other features of the invention will be elucidated in conjunction with the accompanying drawings.

Figure 1 shows a schematic perspective view of an embodiment of the autostereoscopic display according to the invention.

Figure 2 shows a first schematic top view of figure 1.

Figure 3 shows a second schematic top view of figure 1.

Figure 1 shows a schematic perspective view of an embodiment of an autostereoscopic display 1 according to the invention. The display 1 has a substrate 2 on which an array with rows 3, 4, 5, 6 of sub-pixels R, G, B, R are arranged. Each row 3, 4, 5, 6 has a single color R,G,B of sub-pixels.

The array of sub-pixels R, G, B is lined with a lenticular lens stack having elongate lenses 7, which extend in a first direction V, while the rows 3, 4, 5, 6 extend in a second, perpendicular direction H.

Figure 2 shows a first schematic top view of figure 1. The elongate lens 7 is shown with dashed lines over the array of sub-pixels R, G, B.

The rows 3, 4, 5, 6 comprise a plurality of sub-pixels R, G, B, R respectively, which each have an isosceles trapezoid shape and wherein the shape is alternately mirrored over the first direction V as well as the second direction H. This allows for a very compact packing of the sub-pixels R, G, B, while there is still enough space 8 present between the sub-pixels R, G, B, to accommodate for wiring.

The row 3 has sub-pixels R of a single color. The row 6 is the subsequent row with sub-pixels R of the same, single color. The sub-pixels R are arranged at a sub-pixel pitch P_p and the row 6 is shifted along the second direction H over ½ P_p relative to the row 3.

The lenses 7 of the lenticular lens stack have a width and therefore corresponding pitch of P_E. The elongate lens 7 covers in this embodiment three and a half sub-pixels R of a row 3, such that $P_E = (m + 1/n)P_p$, where m=3 and n=2. For other embodiments, m is an integer and starts at 1, *i.e.* m= 1, 2, 3, …, while n is also an integer starting at 2, *i.e.* n = 2, 3, 4, … . The same applies for the other rows 4, 5, 6, wherein in particular row 6 is shifted ½ P_p relative to the row 3.

As schematically shown in figure 3, this arrangement results in a row 3 with a single color of sub-pixels R and a subsequent row 6 with the same single color of sub-pixels R, wherein 3 ½ sub-pixels R of each row 3, 6 are covered by the elongate lens 7. Because the subsequent row 6 is shifted over ½ P_p, seven separate views V_1 – V_7 are created: four by the row 3 and three by the subsequent row 6 (for the adjacent lens 7, four views will be created by the row 6 and three by the row 3, such that each row 3, 6 will on average provide 3 ½ view for each lens 7).

So, with an autostereoscopic display according to the invention the number of views can be increased by combining subsequent rows of sub-pixels and by shifting the subsequent rows. For example, when a lens would cover three and a third sub-pixels, then three rows should be used, each shifted over 1/3 P_p. This will result in 3 * 3 1/3 = 10 views.

Conclusies

1. Autostereoscopisch scherm omvattende een array van sub-beeldpunten die is bekleed met een zichtveranderende laag, zoals een lenticulaire lens stack of een parallax barrier,

waarin de zichtveranderende laag een meervoud van parallelle langwerpige elementen heeft die zich uitstrekken in een eerste richting en waarin de langwerpige elementen zijn opgesteld met een elementsteekafstand in een tweede richting haaks op de eerste richting;

waarin de array van sub-beeldpunten rijen heeft van sub-beeldpunten die zich uitstrekken in de tweede richting met de sub-beeldpunten op een vaste sub-beeldpunt-steekafstand;

met het kenmerk dat

twee opeenvolgende rijen van sub-beeldpunten ten opzichte van elkaar verschoven zijn in de tweede richting over een afstand van 1/n-de van de sub-beeldpunt-steekafstand, waarin n = 2, 3, 4, …;

en waarin de elementsteekafstand gelijk is aan m+1/n-de van de sub-beeldpunt-steekafstand, waarin m = 1, 2, 3, ….

2. Autostereoscopisch scherm volgens conclusie 1, waarin de sub-beeldpunten van een rij een enkele kleur hebben en waarin de array van sub-beeldpunten in de eerste richting een herhalend patroon heeft van rijen van sub-beeldpunten van verschillende kleuren, bijvoorbeeld rood, groen en blauw, waarin de aanliggende sub-beeldpunten binnen het herhalend patroon in de eerste richting een beeldpunt vormen.

3. Autostereoscopisch scherm volgens conclusie 1, waarin de verschillende kleuren voor een beeldpunt zijn

opgesteld in een vast patroon over een aantal sub-beeldpunten in ofwel dezelfde rij ofwel een aantal aanliggende rijen.

4. Autostereoscopisch scherm volgens een der voorgaande conclusies, waarin de langwerpige elementen van de zichtveranderende laag langwerpige lenzen zijn van een lenticulaire lens stack.

5. Autostereoscopisch scherm volgens een der voorgaande conclusies, waarin de randen van elk sub-beeldpunt niet-parallel zijn aan de eerste richting.

6. Autostereoscopisch scherm volgens conclusie 5, waarin elk sub-beeldpunt een polygonale vorm heeft.

7. Autostereoscopisch scherm volgens conclusie 6, waarin elk sub-beeldpunt een trapezoïde vorm heeft met de parallelle zijden van de trapezoïde vorm parallel aan de tweede richting en waarin de vorm van opeenvolgende sub-beeldpunten in de tweede richting is gespiegeld over zowel de eerste richting als de tweede richting.

8. Autostereoscopisch scherm volgens conclusie 7, waarin elk sub-beeldpunt een gelijkbenige trapezoïde vorm heeft.

9. Autostereoscopisch scherm volgens conclusie 6, waarin elk sub-beeldpunt een hexagonale vorm heeft.

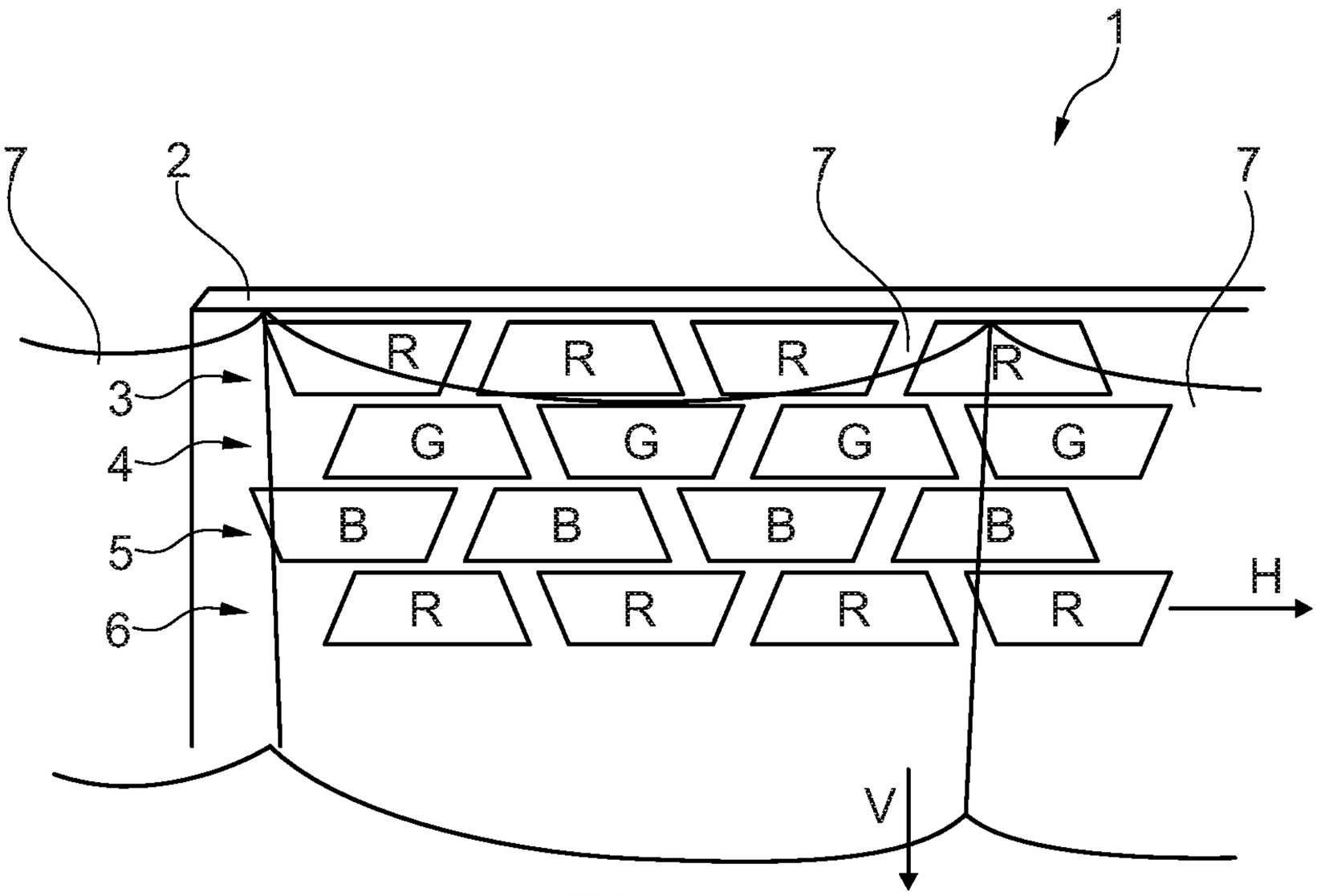

1
7
2
7
7
R
R
R
R
3
G
G
G
G
4
B
B
B
B
5
R
R
R
R
6
H
V

Fig. 1

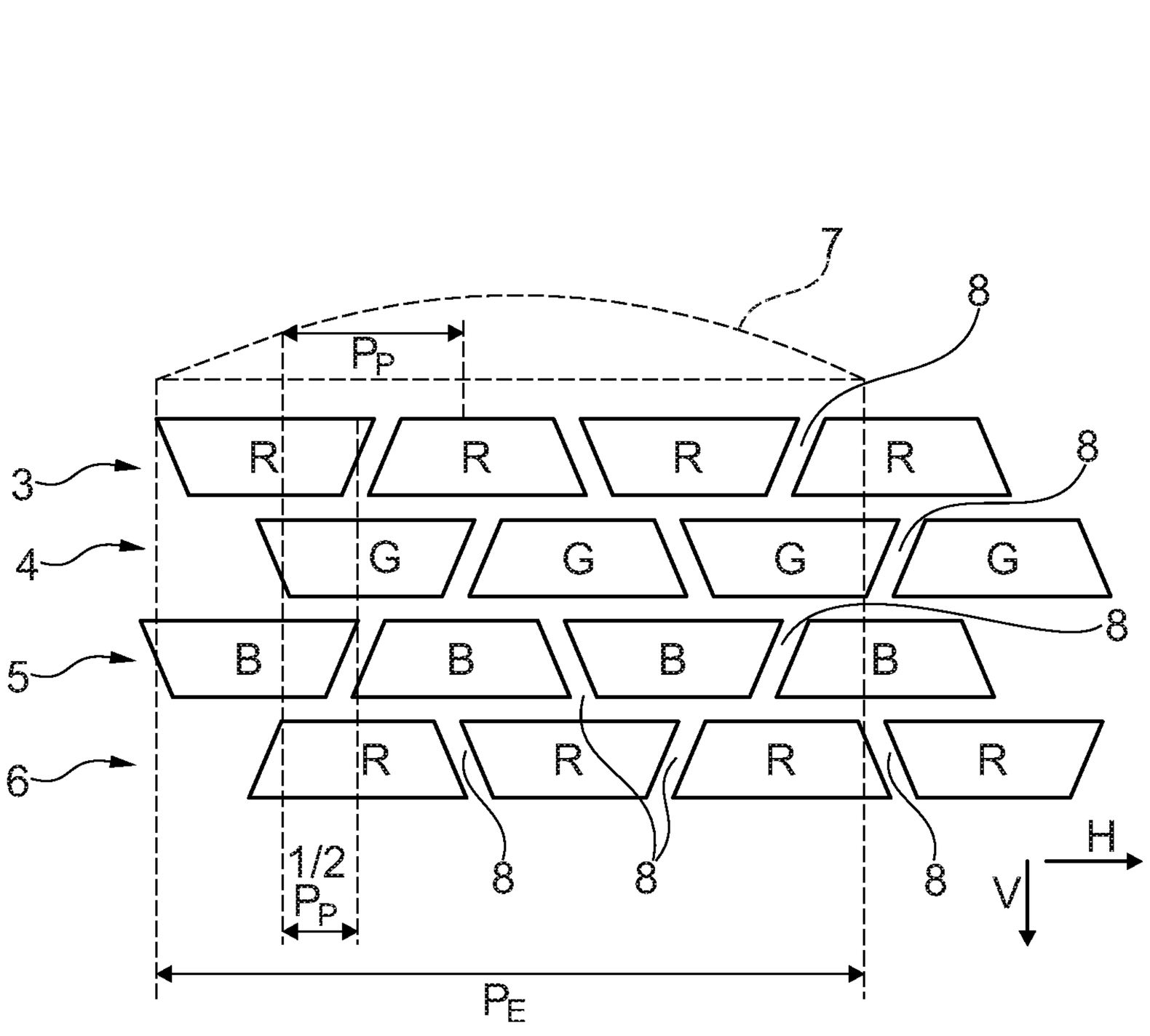
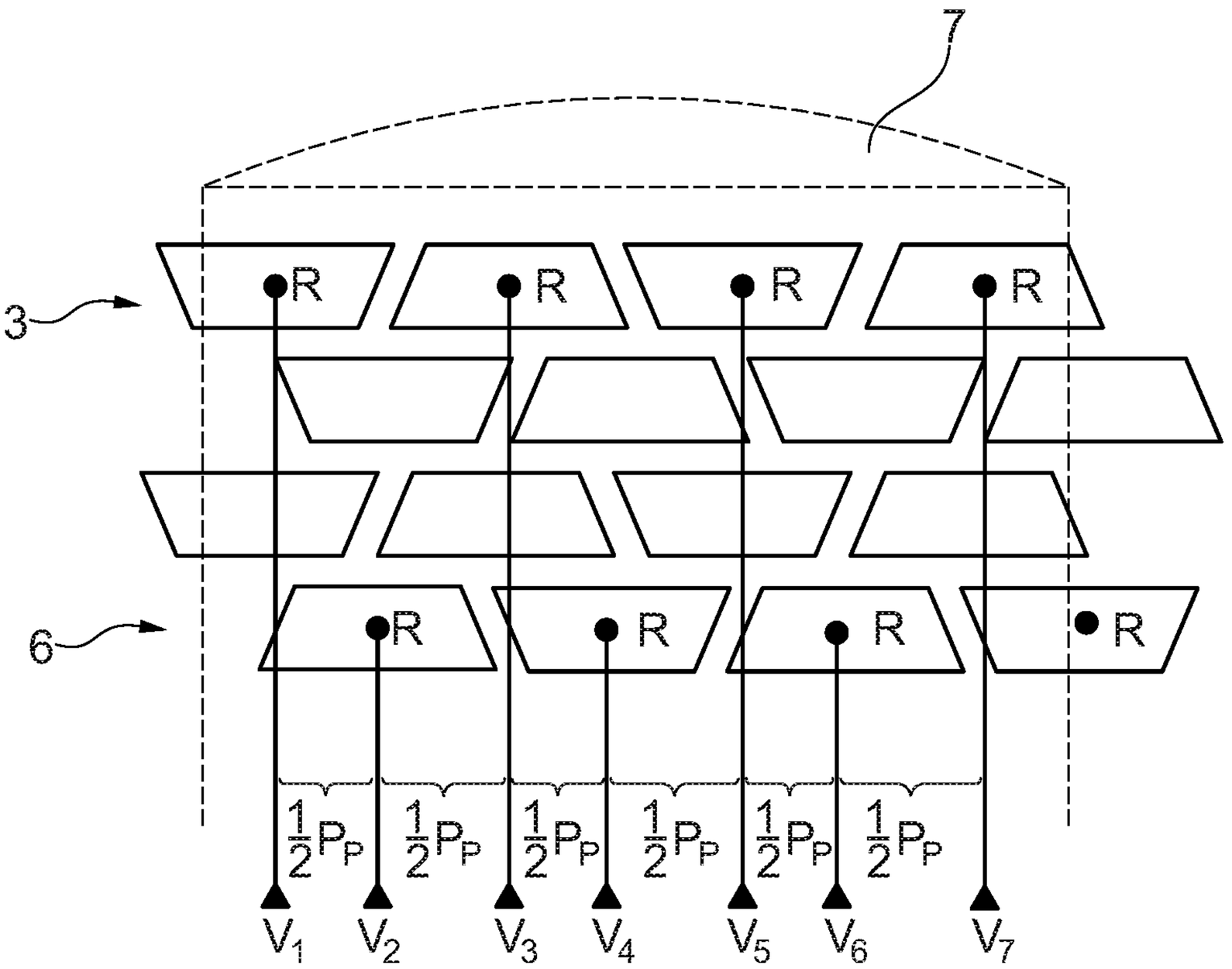

7
8
P_P
R
R
R
R
3
8
G
G
G
G
4
B
B
B
B
5
8
R
R
R
R
6
H
1/2
P_P
8
8
8
V
P_E

Fig. 2


7
3
6
R
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R
R
R
R
R
R
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$\frac{1}{2}P_P$
$\frac{1}{2}P_P$
$\frac{1}{2}P_P$
$\frac{1}{2}P_P$
$\frac{1}{2}P_P$
V_1
V_2
V_3
V_4
V_5
V_6
V_7

Fig. 3

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE
	035,07,NLPD
Nederlands aanvraag nr. **2022313**	Indieningsdatum **24-12-2018**
	Ingeroepen voorrangsdatum

Aanvrager (Naam)

Zhangjiagang Kangde Xin Optronics Material Co. LTD

Datum van het verzoek voor een onderzoek van internationaal type	Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr.
04-05-2019	**SN73557**

I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)

Volgens de internationale classificatie (IPC)

G02B27/22;H04N13/305

II. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimumdocumentatie

Classificatiesysteem	Classificatiesymbolen
IPC	**G02B;H04N**

Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

III. ☐	**GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES**	(opmerkingen op aanvullingsblad)
IV. ☐	**GEBREK AAN EENHEID VAN UITVINDING**	(opmerkingen op aanvullingsblad)

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2022313

A. CLASSIFICATIE VAN HET ONDERWERP
INV. G02B27/22 H04N13/305
ADD.

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

B. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte miminum documentatie (classificatie gevolgd door classificatiesymbolen)
G02B H04N

Onderzochte andere documentatie dan de mimimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)
EPO-Internal, WPI Data

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie °	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X	DE 10 2006 010971 A1 (NEWSIGHT GMBH [DE]) 21 september 2006 (2006-09-21) * samenvatting * * alineas [0001]; [0020]-[0022]; [0242]-[0253]; [0256]-[0258]; [0278]-[0322]; [0323]; [0369]-[0381]; [0382]-[0388]; [0406]-[0411]; [0412]-[0433]; [0477]-[0487]; [0502]-[0506] * * figuren 1-22 * -----	1-9
X	EP 2 490 451 A1 (KONINKL PHILIPS ELECTRONICS NV [NL]) 22 augustus 2012 (2012-08-22) * samenvatting * * alineas [0001]; [0010]-[0015]; [0016]-[0030]; [0032]-[0047]; [0051]-[0097] * * figuren 1-14 * -----	1-9

☐ Verdere documenten worden vermeld in het vervolg van vak C.

☒ Leden van dezelfde octrooifamilie zijn vermeld in een bijlage

° Speciale categorieën van aangehaalde documenten

"A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

"D" in de octrooiaanvrage vermeld

"E" eerdere octrooi(aanvrage), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

"L" om andere redenen vermelde literatuur

"O" niet-schriftelijke stand van de techniek

"P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur

"T" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvrage, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding

"X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

"&" lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid	Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type
20 september 2019	

Naam en adres van de instantie	De bevoegde ambtenaar
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Kienle, Philipp

Formulier PCT/ISA/201 (tweede blad) (Januari 2004)

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2022313

In het rapport genoemd octrooigeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
DE 102006010971 A1	21-09-2006	DE 102006010971 A1	21-09-2006
		WO 2006094780 A2	14-09-2006
EP 2490451 A1	22-08-2012	BR 112013020715 A2	18-10-2016
		CN 103348687 A	09-10-2013
		EP 2490451 A1	22-08-2012
		EP 2676447 A1	25-12-2013
		JP 5838228 B2	06-01-2016
		JP 2014511501 A	15-05-2014
		KR 20140020927 A	19-02-2014
		RU 2013142345 A	27-03-2015
		TW 201240441 A	01-10-2012
		US 2014002897 A1	02-01-2014
		WO 2012110934 A1	23-08-2012

WRITTEN OPINION

File No.	Filing date *(day/month/year)*	Priority date *(day/month/year)*	Application No.
SN73557	24.12.2018		NL2022313
International Patent Classification (IPC) INV. G02B27/22 H04N13/305			
Applicant Zhangjiagang Kangde Xin Optronics Material Co. LTD			

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the application
- ☒ Box No. VIII Certain observations on the application

	Examiner
	Kienle, Philipp

Application number

WRITTEN OPINION

NL2022313

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ on paper

   ☐ in electronic form

   c. time of filing/furnishing:

   ☐ contained in the application as filed.

   ☐ filed together with the application in electronic form.

   ☐ furnished subsequently for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes:	Claims	
	No:	Claims	1-9
Inventive step	Yes:	Claims	
	No:	Claims	1-9
Industrial applicability	Yes:	Claims	1-9
	No:	Claims	

2. Citations and explanations

see separate sheet

Application number

WRITTEN OPINION

NL2022313

Box No. VII Certain defects in the application

see separate sheet

Box No. VIII Certain observations on the application

see separate sheet

Re Item VIII

1 **Clarity - certain observations on the application**

Claims 1 and 2 are not clear.

1.1 The use of terms like *"in het bijzonder" (in particular), "bij voorkeur" (preferably),"met meer voorkeur" (more preferably)*, *"bijvoorbeeld", "zoals" (e.g. / for example)* or *"(en mogelijk)" (possibly)* in claims 1 and 2 has no limiting effect on the scope of the claim. Consequently, the before mentioned kind of terms should be removed from the claims 1 and 2 and the wording should be adapted accordingly.

1.2 It is clear from the description on page 5 (see lines 16-17 and Figure 1) that the following features are essential to the definition of the invention:
- *"The display 1 has a substrate 2 on which an array with rows 3, 4, 5, 6 of sub-pixels R, G, B, R are arranged."*

Since independent claim 1 does not contain these features it does not meet the requirement of clarity that any independent claim must contain all the technical features essential to the definition of the invention.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1 DE 10 2006 010971 A1 (NEWSIGHT GMBH [DE]) 21 september 2006 (2006-09-21)

D2 EP 2 490 451 A1 (KONINKL PHILIPS ELECTRONICS NV [NL]) 22 augustus 2012 (2012-08-22)

2 **INDEPENDENT CLAIMS**

NOVELTY

Furthermore, notwithstanding the above-mentioned lack of clarity, the subject-matter of device claim 1 is not new, and the criteria of patentability are therefore not met.

2.1 **CLAIM 1**

Document D1 discloses ***(references in brackets refer to this document)***.

Autostereoscopisch scherm ***(see D1: Abstract; Figures 1-22; Page 2; Paragraph [0001]; Pages 4-5; Paragraphs [0020]-[0021]; Page 30, Paragraph [0242] to Page 32, Paragraph [0246])*** omvattende

- een array van sub-beeldpunten die is bekleed met een zichtveranderende laag, zoals een lenticulaire lens stack of een parallax barrier ***(see D1: Figures 10a-10b; Pages 4-5; Paragraphs [0021]-[0022]; Page 38, Paragraph [0323]; Pages 41-42, Paragraphs [0369]-[0381]; Page 44, Paragraph [0406])***,

- waarin de zichtveranderende laag een meervoud van parallelle langwerpige elementen heeft die zich uitstrekken in een eerste richting en waarin de langwerpige elementen zijn opgesteld met een elementsteekafstand in een tweede richting haaks op de eerste richting ***(see D1: Figures 10a-10e, 12a-12c; Page 32, Paragraphs [0256]-[0258]; Page 38, Paragraph [0323]; Page 42, Paragraphs [0382]-[0388]; Pages 44-45; Paragraphs [0406]-[0411])***;

- waarin de array van sub-beeldpunten rijen heeft van sub-beeldpunten die zich uitstrekken in de tweede richting met de sub-beeldpunten op een vaste sub-beeldpunt-steekafstand ***(see D1: Figures 12a-12c; Page 45; Paragraph [0412] to Page 47, Paragraph [0433])***;

- warbij twee opeenvolgende rijen van sub-beeldpunten ten opzichte van elkaar verschoven zijn in de tweede richting over een afstand van 1/n-de van de sub-beeldpunt-steekafstand, waarin n = 2, 3, 4, ... ***(see D1: Figures 1-22; Page 31; Paragraph [0244] to Page 32, Paragraph [0253]; Page 34, Paragraph [0278] to Page 38, Paragraph [0322])***;

- en waarin de elementsteekafstand gelijk is aan m+1/n-de van de sub-beeldpunt-steekafstand, waarin m = 1, 2, 3, ... ***(see D1: Figures 1-22; Page 31; Paragraph [0244] to Page 32, Paragraph [0253]; Page 34, Paragraph [0278] to Page 38, Paragraph [0322])***.

The subject-matter of claim 1 is therefore not new.

2.2 For the sake of completeness it is indicated that in the light of document D2 the subject-matter of device claim 1 is also not new. See e.g. documents D2 ***(see Abstract; Figures 1-14; Pages 2-3; Paragraphs [0001], [0010]-[0015]; Pages 3-4, Paragraphs [0016]-[0030]; Page 4, Paragraph [0032] to Page 5, Paragraph [0047]; Page 5, Paragraph [0051] to Page 9, Paragraph [0097])***;

3 DEPENDENT CLAIMS

Dependent claims 2-9 do not appear to contain any additional features which, in combination with the features of any claim to which it refers, meet the requirements of novelty.

Novelty

3.1 Claim 2: Not new, because the subject-matter of claim 2 is disclosed in ***D1: see Figures 12a-12c; Page 45; Paragraph [0412] to Page 47, Paragraph [0433];*** The subject-matter of claim 2 is in the light of document D2 ***(see Figures 1-5; Page 5, Paragraph [0047] to Page 6, Paragraph [0056])***, mutatis mutandis, also not new.

3.2 Claim 3: Not new, because the subject-matter of claim 3 is disclosed in ***D1: see Figures 12a-12c; Page 45; Paragraph [0412] to Page 47, Paragraph [0433];*** The subject-matter of claim 3 is in the light of document D2 ***(see Figures 1-5; Page 5, Paragraph [0047] to Page 6, Paragraph [0056])***, mutatis mutandis, also not new.

3.3 Claim 4: Not new, because the subject-matter of claim 4 is disclosed in ***D1: see Figures 10a-10b, 12a-12c; Page 38, Paragraph [0323]; Page 44, Paragraph [0406];*** The subject-matter of claim 4 is in the light of respective document D2 ***(see Figures 1-2, 8; Pages 4-5, Paragraphs [0040]-[0046]; Pages 6-7, Paragraphs [0064]-[0069])***, mutatis mutandis, also not new.

3.4 Claim 5: Not new, because the subject-matter of claim 5 is disclosed in ***D1: see Figures 12a-12c; Pages 51-52, Paragraphs [0477]-[0487]; Pages 53-54, Paragraphs [0502]-[0506];*** The subject-matter of claim 5 is in the light of respective document D2 ***(see Figures 3, 8-11; Page 5, Paragraph [0047]; Pages 6-8, Paragraphs [0066]-[0082])***, mutatis mutandis, also not new.

3.5 Claim 6: Not new, because the subject-matter of claim 6 is disclosed in ***D1: see Figures 12a-12c; Page 52, Paragraphs [0484]-[0485]; Pages 53-54, Paragraphs [0504]-[0505];*** The subject-matter of claim 6 is in the light of respective document D2 ***(see Figures 3, 8-11; Page 5, Paragraph [0047]; Pages 6-7, Paragraphs [0066]-[0067]; Page 7, Paragraphs [0071]-[0072], [0076]; Page 8, Paragraph [0081])***, mutatis mutandis, also not new.

3.6 Claim 7: Not new, because the subject-matter of claim 7 is disclosed in ***D1: see Figures 12a-12c; Page 52, Paragraphs [0484]-[0485]; Pages 53-54, Paragraphs [0504]-[0505];*** The subject-matter of claim 7 is in the light of respective document D2 ***(see Figures 3, 8-11; Page 5, Paragraph [0047]; Pages 6-7, Paragraphs [0066]-[0067]; Page 7, Paragraphs [0071]-[0072], [0076]; Page 8, Paragraph [0081])***, mutatis mutandis, also not new.

3.7 Claim 8: Not new, because the subject-matter of claim 8 is disclosed in ***D1: see Figures 12a-12c; Page 52, Paragraphs [0484]-[0485]; Pages 53-54, Paragraphs [0504]-[0505];*** The subject-matter of claim 8 is in the light of respective document D2 ***(see Figures 3, 8-11; Page 5, Paragraph [0047]; Pages 6-7, Paragraphs [0066]-[0067]; Page 7, Paragraphs [0071]-[0072], [0076]; Page 8, Paragraph [0081])***, mutatis mutandis, also not new.

3.8 Claim 9: Not new, because the subject-matter of claim 9 is disclosed in ***D1: see Figures 12a-12c; Page 52, Paragraphs [0484]-[0485]; Pages 53-54, Paragraphs [0504]-[0505];*** The subject-matter of claim 9 is in the light of respective document D2 ***(see Figures 3, 8-11; Page 5, Paragraph [0047]; Pages 6-7, Paragraphs [0066]-[0067]; Page 7, Paragraphs [0071]-[0072], [0076]; Page 8, Paragraph [0081])***, mutatis mutandis, also not new.

The subject-matter of claims 2-9 is therefore not new.

4 **Re Item VII**

Certain defects in the application

In addition to the objections raised above, the attention of the applicant is drawn to the following points concerning the different parts of the application documents:

4.1 Amendments relating to the claims:

- they should be drafted in the two part form, which in the present case would be appropriate, and delimited against the most relevant prior art, namely D1 and D2;

4.2 Amendments relating to the description:

- the background part of the description should be revised to include a summary of the most relevant prior art with an identification of the document(s) on which said prior art is based, namely D1 and D2;

- the description should be brought into conformity with the new claims.

4.3 Furthermore, the applicant should indicate when filing amendments:

- the difference between the subject-matter of the new claim and the state of the art, and the significance thereof with regard to the inventive step involved by the claimed invention;

- where a basis can be found for the amendments in the documents as originally filed.