

Search query (3): [SP]: figs. 1a and 1b are side schematic views of a prior art prismatic retroreflective film with no printed ink layer and with the combination of an ink layer and a clear coat, respectively fig. 2 is a side schematic view of the retroreflective film of the invention which includes a halftone printed pattern of ink over its front surface figs. 3a and 3b illustrate an enlarged plan view of the halftone layer of ink on the sheeting of fig. 2 and an unenlarged plan view of this halftone layer of ink, respectively figs. 4a, 4b, 4c and 4d illustrate four different geometrical shapes that the dots used in the halftone layer of ink may take fig. 5 is an enlarged view of an embodiment of the inventive sheeting wherein the halftone ink layer is formed from parallel lines of ink deposited over a retroreflective material employing glass beads fig. 6 illustrates the relative brightness of sheet material having a halftone layer of ink that covers 80 percent, 70 percent and 60 percent of the halftone area, respectively fig. 7 is a perspective diagram showing the application of the invention and the definition of the angle of incidence and the angle of observation fig. 8 is a graph illustrating the reflectivity of the retroreflective sheet material of the invention when a halftone layer of green ink is used at coverages of between 100 percent and 60 percent at a 30 degrees entrance angle and observation angles of 0.1 degrees, 0.2 degrees and 0.5 degrees, respectively fig. 9 is a table of the data used in generating the graph of fig. 8 fig. 10 is a graph illustrating the reflectivity of the retroreflective sheet material of the invention when a halftone layer of green ink is used at coverages of between 100 percent and 60 percent at a -4.0 degrees entrance angle and observation angles of 0.1 degrees, 0.2 degrees and 0.5 degrees, respectively fig. 11 is a table of the data used in generating the graph of fig. 10 fig. 12 is a graph illustrating the reflectivity of the retroreflective sheet material of the invention when a halftone layer of blue ink is used at coverages of between 100 percent and 70 percent at a 30 degrees entrance angle and observation angles of 0.1 degrees, 0.2 degrees and 0.5 degrees, respectively fig. 13 is a table of the data used in generating the graph of fig. 12 fig. 14 is a graph illustrating the reflectivity of the retroreflective sheet material of the invention when a halftone layer of blue ink is used at coverages of between 100 percent and 60 percent at a -4.0 degrees entrance angle and observation angles of 0.1 degrees, 0.2 degrees and 0.5 degrees, respectively, and fig. 15 is a table of the data used in generating the graph of fig. 14.

Results: 14

Search history

Search FT=(printed retroreflective film and retroreflective elements and printed ink layer) (Results 1)

1:

Search FT=(printed retroreflective film and retroreflective elements and printed ink layer) (Results 1)

2:

Search [SP]: figs. 1a and 1b are side schematic views of a prior art prismatic retroreflective film with no printed ink layer and with the combination of an ink layer and a clear coat, respectively fig. 2 is a side schematic view of the retroreflective film of the invention which includes a halftone printed pattern of ink over its front surface figs. 3a and 3b illustrate an enlarged plan view of the halftone layer of ink on the sheeting of fig. 2 and an unenlarged plan view of this halftone layer of ink, respectively figs. 4a, 4b, 4c and 4d illustrate four different geometrical shapes that the dots used in the halftone layer of ink may take fig. 5 is an enlarged view of an embodiment of the inventive sheeting wherein the halftone ink layer is formed from parallel lines of ink deposited over a retroreflective material employing glass beads fig. 6 illustrates the relative brightness of sheet material having a halftone layer of ink that covers 80 percent, 70 percent and 60 percent of the halftone area, respectively fig. 7 is a perspective diagram showing the application of the invention and the definition of the angle of incidence and the angle of observation fig. 8 is a graph illustrating the reflectivity of the retroreflective sheet material of the invention when a halftone layer of green ink is used at coverages of between 100 percent and 60 percent at a 30 degrees entrance angle and observation angles of 0.1 degrees, 0.2 degrees and 0.5 degrees, respectively fig. 9 is a table of the data used in generating the graph of fig. 8 fig. 10 is a graph illustrating the reflectivity of the retroreflective sheet material of the invention when a halftone layer of green ink is used at coverages of between 100 percent and 60 percent at a -4.0 degrees entrance angle and observation angles of 0.1 degrees, 0.2 degrees and 0.5 degrees, respectively fig. 11 is a table of the data used in generating the graph of fig. 10 fig. 12 is a graph illustrating the reflectivity of the retroreflective sheet material of the invention when a halftone layer of blue ink is used at coverages of between 100 percent and 70 percent at a 30 degrees entrance angle and observation angles of 0.1 degrees, 0.2 degrees and 0.5 degrees, respectively fig. 13 is a table of the data used in generating the graph of fig. 12 fig. 14 is a graph illustrating the reflectivity of the retroreflective sheet material of the invention when a halftone layer of blue ink is used at coverages of between 100 percent and 60 percent at a -4.0 degrees entrance angle and observation angles of 0.1 degrees, 0.2 degrees and 0.5 degrees, respectively, and fig. 15 is a table of the data used in generating the graph of fig. 14. (Results 14)

1) Family number: 53537691 (US2013100532A)

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Title: RETROREFLECTIVE SHEETING HAVING A HALFTONE PRINTED FRONT SURFACE

Abstract: A printed retroreflective film has a planar surface on a front side and a plurality of retroreflective elements on a back side. A halftone printed ink layer is deposited on the planar surface formed from uniformly spaced, discrete dots of deposited ink. The areas between the dots provide light-transmissive openings that receive incident light and transmit retroreflected light. The aggregate area of the dots forming the half-tone pattern preferably covers between about 60 percent and 90 percent of the area of the half-tone pattern. The use of such a halftone pattern of ink increases the reflectivity of the printed retroreflective sheeting by reducing the amount of light absorbed by the ink, and by reducing the amount of light scattered by the layer of ink. The use of such a halftone pattern of ink further obviates the need for an anti-light scattering topcoat or film over the front surface of the retroreflective sheet.

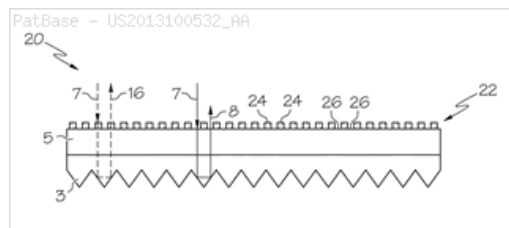
Classifications:

International (IPC 8-9): B32B7/02 G02B G02B5/124 G02B5/128

G09F13/16 (Advanced/Invention)

CPC: G02B5/124 G02B5/128

US: 359/530



Family:

Publication number	Publication date	Application number	Application date
AU2012336200 AA	20130516	AU20120336200	20121019
AU2012336200 BB	20160218	AU20120336200	20121019
BR112014009820 A2	20170418	BR20141109820	20121019
CA2853078 AA	20140422	CA20122853078	20121019
CN103998954 A	20140820	CN201280062682	20121019
CO6950466 A2	20140520	CO20140093864	20140502

EP2769248 A1	20140827	EP20120788350	20121019
IN03485CN2014 A	20150703	IN2014CN03485	20140508
JP2014535075 T2	20141225	JP20140537270T	20121019
JP6234930 B2	20171122	JP20140537270T	20121019
KR20140084214 A	20140704	KR20147013384	20121019
MX2014004832 A1	20140821	MX20140004832	20121019
NZ721957 A	20180126	NZ20120721957	20121019
RU2014119864 A	20151127	RU20140119864	20121019
RU2627960 C2	20170814	RU20140119864	20121019
US2013100532 AA	20130425	US20120655660	20121019
US9746590 BB	20170829	US20120655660	20121019
WO13070413 A1	20130516	WO2012US60961	20121019
ZA201403280 A	20150930	ZA20140003280	20140508

Priority:

US20110548777P 20111019 NZ20120624266 20121019 US20120655660 20121019
WO2012US60961 20121019

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Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

2) Family number: 15766494 (US6325515B)

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Title: CUBE CORNER RETROREFLECTIVE ARTICLE WITH ENHANCED PIGMENTATION

Abstract: Retroreflective sheeting includes a transparent film, a pigmented layer having pigmented indicia thereon, and a retroreflective cube layer. The cube layer includes a number of cube corner elements bounded by at least two sets of intersecting grooves. A metallic film is disposed on at least some of the cube corner elements. The pigmented layer is interposed between the transparent film and the cube layer, and has pigmented indicia aligned with at least one of the sets of intersecting grooves.

Classifications:

International (IPC 8-9): B32B15/08 B32B7/02 G02B1/00

G02B5/124 (Advanced/Invention);

G02B5/124 (Advanced/Non-invention);

G02B5/12 (Core/Invention)

International (IPC 1-7): B32B15/08 B32B7/02 G02B1/00 G02B5/124

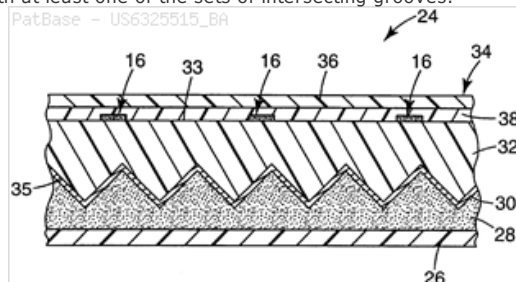
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G02B5/124

European: G02B5/124

US: 264/1.9 359/529 359/530 359/900 428/167 428/168 428/172 428/30

Locarno class: 16/06



Family:

Publication number	Publication date	Application number	Application date
AT275733 E	20040915	AT20010924125T	20010307
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KR100787410 B1	20071221	KR20027013635	20010307
KR20030045669 A	20030611	KR20027013635	20010307
MY126016 A	20060929	MY20010001149	20010313
NZ521798 A	20040326	NZ20010521798	20010307
RU2002127789 A	20040420	RU20020127789	20010307
US6325515 BA	20011204	US20000548894	20000413
WO0179897 A2	20011025	WO2001US07341	20010307

WO0179897 A3	20030206	WO2001US07341	20010307
ZA200209191 A	20030821	ZA20020009191	20021112

Priority:

US20000120439F 20000321 US20000120546F 20000321 US20000548894 20000413
WO2001US07341 20010307 WO2001US07341 20021011

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Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EE ES FI FR GA GB GD GE GH GM GN GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LI LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NE NL NO NZ PL PT RO RU SD SE SG SI SK SL SN SZ TD TG TJ TM TR TT TZ UA UG UZ VN YU ZA ZW

3) Family number: 20358275 (US5900978A)

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Title: Retroreflective materials

Abstract: PCT No. PCT/GB94/02537 Sec. 371 Date Jul. 19, 1996 Sec. 102(e) Date Jul. 19, 1996 PCT Filed Nov. 17, 1994 PCT Pub. No. WO95/14248 PCT Pub. Date May 26, 1995A material such as fabric, plastic, leather or paper incorporates retroreflective properties which result from the application of metal coated microbeads. Methods for the application of microbeads to various surfaces as well as the formulation of printing inks containing microbeads are disclosed.

Classifications:

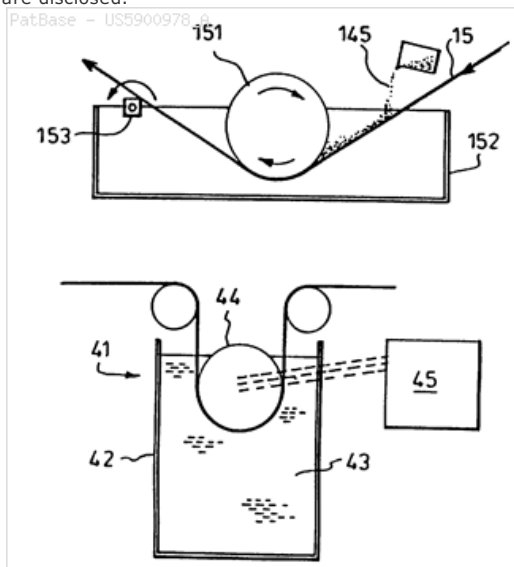
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International (IPC 1-7): A41D1/00 A41D13/01 B05D5/06 B32B7/02 C09D11/02 C09D5/00 C09D7/12 C09J5/00 D06M11/79 D06M23/02 D06Q1/10 D21H19/00 G02B5/128

CPC: G02B5/128

European: G02B5/128

US: 359/536 359/539



Family:

Publication number	Publication date	Application number	Application date
AU199510325 A1	19950606	AU19950010325	19941117
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JP9506301 T2	19970624	JP19950514309T	19941117
US5900978 A	19990504	US19960648042	19960719
WO9514248 A2	19950526	WO1994GB02537	19941117
WO9514248 A3	19950727	WO1994GB02537	19941117

Priority:

GB19930023673 19931117 GB19930023713 19931117 EP19950900878 19941117
WO1994GB02537 19941117

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Inventor(s): BRIAN SAGAR ; ROBERT MOULE

Designated states: AT AU BB BE BF BG BJ BR BY CA CF CG CH CI CM CZ DE DK EE ES FI FR GA GB GN GR HU IE IT JP KP KR KZ LI LK LU MC MG ML MN MR MW NE NL NO NZ PL PT RO RU SD SE SK SN TD TG UA US UZ VN

4) Family number: 20754231 (US6024455A)

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Title: Reflective article with concealed retroreflective pattern

Abstract: A reflective article has a multilayer film covering a patterned retroreflective layer. In one embodiment the patterned retroreflective layer includes a separate indicia layer covering a retroreflective substrate. The indicia are substantially hidden under normal viewing conditions but easily detectable under retroreflective lighting conditions. Various types of retroreflective layers are disclosed. The article can also include microstructured relief patterns which produce holographic images under ambient lighting but which disappear under retroreflective conditions. The multilayer film includes alternating layers of at least a first and second polymer, and has a relatively high reflectivity for normally incident light within a first spectral range which is approximately coextensive with the visible spectrum, and a relatively low reflectance for normally incident light within a second spectral range. The second spectral range can include a transmission window of 15 percent or less fractional bandwidth located at least partially in the visible spectrum. Film constructions are disclosed which achieve sharper spectral transitions than previously attainable. Film constructions are also disclosed which preserve such sharp transitions even at high entrance (tilt) angles.

Classifications:

International (IPC 8-9): G02B5/124 G02B5/128

G02B5/26 (Advanced/Invention);

G02B5/124 G02B5/26 (Advanced/Non-invention);

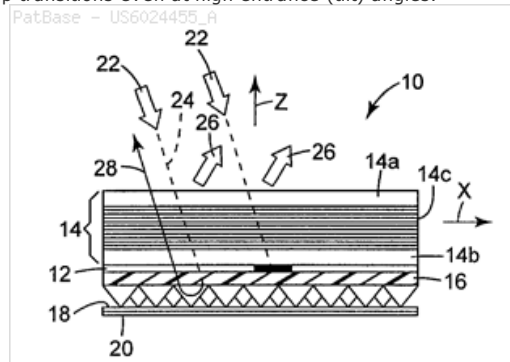
G02B5/12 G02B5/26 (Core/Invention)

International (IPC 1-7): G02B5/124 G02B5/128 G02B5/26 G02B51/28

CPC: G02B5/124

European: G02B5/124

US: 283/85 283/87 283/91 359/489.06 359/489.11 359/489.19 359/498 359/529 359/530 359/584 359/590



Family:

Publication number	Publication date	Application number	Application date
AU199918126 A1	19990802	AU19990018126	19981210
AU738111 B2	20010906	AU19990018126	19981210
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BRPI9814000 B1	20090113	BR1998PI14000	19981210
CA2316266 AA	20000627	CA19982316266	19981210
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CN1138992 C	20040218	CN19988013668	19981210
CN1285047 A	20010221	CN19988013668	19981210
DE69816129 D1	20030807	DE19986016129	19981210
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EP1047960 A1	20001102	EP19980963010	19981210
EP1047960 B1	20030702	EP19980963010	19981210
ES2198087 T3	20040116	ES19980963010T	19981210
JP2002509277 T2	20020326	JP20000540460T	19981210
KR100552889 B1	20060222	KR20007007669	19981210
KR20010034060 A	20010425	KR20007007669	19981210
US6024455 A	20000215	US19980006292	19980113
WO9936806 A1	19990722	WO1998US26180	19981210

Priority:

US19980006292 19980113 WO1998US26180 19981210

Probable Assignee: 3M CO

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Inventor(s): (std): BENSON JR ; BENSON O ; BENSON OLESTER JR ; HANSON B ; HANSON GARY B ; HANSON GARY BERTIN ; O NEILL B ; O NEILL MARK BRIAN ; WEBER F ; WEBER MICHAEL F ; WHEATLEY A ; WHEATLEY JOHN A ; WEBER M F ; ONEILL M B ; OLESTER BENSON JR ; O NEILL MARK B ; O NEILL MARK ; O BENSON JR ; O BENSON ; MICHAEL F WEBER ; MF WEBER ; MB ONEILL ; MARK B O NEILL ; JR ; JOHN A WHEATLEY ; JAMES M JONZA ; GARY B HANSON ; BENSON OLESTER ; BENSON O JR ; BENSON JR OLESTER ; JONZA JAMES M ; JONZA JAMES MICHAEL ; JONZA JOHN M ; JONZA M

Inventor(s): M B ONEILL ; M F WEBER ; MARK BRIAN O NEILL ; OLESTER BENSON ; JAMES MICHAEL JONZA ; GARY BERTIN HANSON

Agent(s): DAVIES COLLISON CAVE; DAVIES COLLISON CAVE PTY LTD; SMART AND BIGGAR

Designated states: AL AM AT AU AZ BA BB BE BF BG BJ BR BY CA CF CG CH CI CM CN CU CY CZ DE DK EE ES FI FR GA GB GD GE GH GM GN GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LI LK LR LS LT LU LV MC MD MG MK ML MN MR MW MX NE NL NO NZ PL PT RO RU SD SE SG SI SK SL SN SZ TD TG TJ TM TR TT UA UG UZ VN YU ZW

5) Family number: 28248585 (US2002086143A)

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Title: RETROREFLECTIVE SHEETING HAVING PRINTED LAYER

Abstract: Retroreflective sheeting comprising a retroreflective base having a smooth surface layer (4) on its light-incident side and a fluorine-containing resin film (1) having a total light transmittance of 80 percent or more which is provided on the smooth surface layer (4) via an adhesive layer (3), wherein a printed layer (2) made of discontinuous printed parts is provided between the film (1) and the adhesive layer (3). The printed layer (2) does not cause the film (1) to separate.

Classifications:

International (IPC 8-9): B32B27/28 B32B27/30 B32B3/10 D06Q1/10 G02B5/124 G02B5/128 G09F13/16 (Advanced/Invention); B32B27/28 B32B27/30 B32B3/10 D06Q1/00 G02B5/12 G09F13/16 (Core/Invention)

International (IPC 1-7): B32B27/14 B32B27/30 B32B3/00 B32B5/16 B32B7/14 D06Q1/10 G02B5/124 G02B5/128 G09F13/16

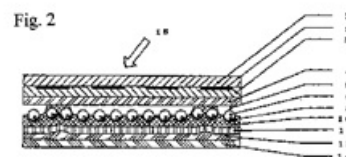
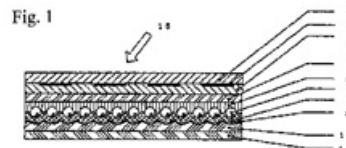
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European: B32B27/28 B32B3/10 G09F13/16

US: 359/515 359/529 40/584 428/195.1 428/204 428/220 428/343 428/411.1 428/421

PatBase - US2002086143_AA

Patent Application Publication Jul. 4, 2002 Sheet 1 of 3 US 2002/006143 A1



Family:

Publication number	Publication date	Application number	Application date
JP2002149095 A2	20020522	JP20000344123	20001110
JP3618292 B2	20050209	JP20000344123	20001110
US2002086143 AA	20020704	US20010934839	20010823
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Priority:

JP20000344123 20001110

Probable Assignee: NIPPON CARBIDE KOGYO KK

Assignee(s): (std): NIPPON CARBIDE KOGYO KK

Assignee(s): NIPPON CARBIDE IND CO INC ; NIPPON CARBIDE KOGYO K USHIKI KAISHA AB ; NIPPON CARBIDE KOGYO KABUSHIKI KAISHA

Inventor(s): (std): MIMURA IKUO ; TANAKA OSAMU

Agent(s): HATORI OSAMU; YOUNG AND THOMPSON

6) Family number: 29434813 (US6119751A)

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Title: APPARATUS AND METHOD FOR PRODUCING RETROREFLECTIVE MATERIAL HAVING PRINTED PATTERNS THEREON

Abstract: A continuous process for producing printed patterns on retroreflective material is disclosed, wherein a partially cured pattern is printed on a roll of film and partially cured cube-corner prisms are bonded to the film over the printed matter thereby encapsulating the printed matter to protect the printed matter from the environment.

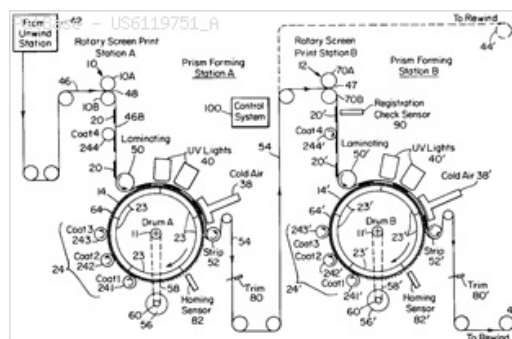
Classifications:

International (IPC 8-9): B29C41/26 B29D11/00 G02B5/12 G02B5/124 (Advanced/Invention); B29C41/00 B29D11/00 G02B5/12 (Core/Invention)

International (IPC 1-7): B24D11/00 B24D7/01 B29D11/00 B29D7/01 B32B31/12 B41M3/14 G02B5/124

CPC: Y10T428/24612 B29C41/26 B29D11/00605 G02B5/124 B42D2035/20

European: B29C41/26 B29D11/00E G02B5/124 L42D35/20
US: 156/230 156/231 156/240 156/277 156/379.6 156/379.8 156/384
264/1.9 264/214 359/530 428/172



Family:

Publication number	Publication date	Application number	Application date
CA2318039 AA	20000712	CA19992318039	19990126
CA2318039 C	20070821	CA19992318039	19990126
DE69903917 D1	20021219	DE19996003917	19990126
DE69903917 T2	20030904	DE19996003917T	19990126
EP1051291 A1	20001115	EP19990902438	19990126
EP1051291 B1	20021113	EP19990902438	19990126
JP2002500969 A2	20020115	JP20000528423	19990126
JP2002500969 T2	20020115	JP20000528423T	19990126
US6119751 A	20000919	US19980013696	19980126
US6120636 A	20000919	US19980170014	19981013
WO9937470 A1	19990729	WO1999US01644	19990126

Priority:

US19980013696 19980126 US19980170014 19981013 WO1999US01644 19990126

Probable Assignee: ORAFOL AMERICAS INC

Assignee(s): (std): REFLEXITE CORP

Assignee(s): REFLEXITE CORP AVON ; ORAFOL AMERICAS INC ; ARES CAPITAL CORP ; BANK OF AMERICA NA ; BERNARD GUS ; FLEET NATIONAL BANK ; HANRAHAN MICHAEL J ; NILSEN ROBERT B

Inventor(s): (std): BERNARD GUS ; HANRAHAN J ; HANRAHAN MICHAEL J ; NILSEN B ; NILSEN ROBERT B

Agent(s): OGILVY RENAULT LLP SENCRL SRL

Designated states: AT BE CA CH CY DE DK ES FI FR GB GR IE IT JP LU MC NL PT SE

7) Family number: 2957147 (US4708920A)

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Title: MICROLENS SHEET CONTAINING DIRECTIONAL HALF-TONE IMAGES AND METHOD FOR MAKING THE SAME

Abstract: A sheet containing an integrated-directional, half-tone image. Each sheet may contain one or more such images. Also a method for forming such images in microlens sheetings comprising directly a highly collimated light through an interposed half-tone mask.

Classifications:

International (IPC 8-9): G02B5/128 G03C1/00 G09F13/16

H04N1/00 (Advanced/Invention);

G02B5/12 G03C1/00 G09F13/16 H04N1/00 (Core/Invention)

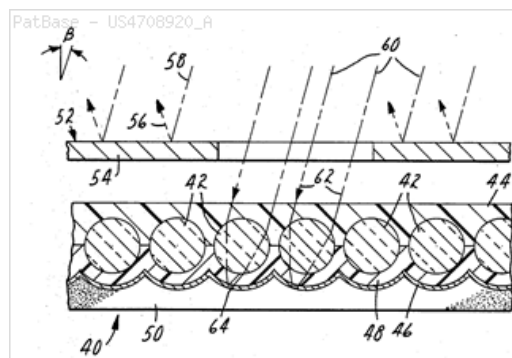
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CPC: Y10S430/146 Y10S430/147 G02B5/128

European: G02B5/128

US: 283/85 283/87 283/91 283/93 430/10 430/11 430/273 430/273.1
430/290 430/346 430/496 430/945 430/946



Family:

Publication number	Publication date	Application number	Application date
CA1273512 A1	19900904	CA19860518149	19860915
DE3682468 D1	19911219	DE19863682468	19860916
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EP0215672 A3	19880601	EP19860307136	19860916
EP0215672 B1	19911113	EP19860307136	19860916
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JP8012282 B4	19960207	JP19860212883	19860911
KR19880004349 A	19880603	KR19860007718	19860913
KR950003435 B1	19950412	KR19860007718	19860913
US4708920 A	19871124	US19870019026	19870226

Priority:

US19850776594 19850916

CA19860518149 19860915

US19870019026 19870226

Probable Assignee: 3M CO**Assignee(s):** (std): 3M CO ; MINNESOTA MINING AND MFG ; MINNESOTA MINING AND MFG CO 3M**Assignee(s):** MINNESOTA MINING AND MFG CO It 3M gt ; MINNESOTA MINING AND MFG CO SAINT PAUL MINN US ; ORENSTEEN BRUCE D ; MINNESOTA MINING AND MFG CO SAINT PAUL MN A CORP OF DE ; MINNESOTA MINING AND MFG CO ; BRADSHAW THOMAS I ; MINNESOTA MINING AND MANUFACTURING COMPANY**Inventor(s):** (std): BRADSHAW THOMAS I ; BRADSHAW THOMAS I MINNESOTA MI ; BURUUSU DEBITSUDO ORENSUTEIIN ; ORENSTEEN BRUCE D ; ORENSTEEN BRUCE D MINNESOTA MI ; TOOMASU AIAN BURATSUDOSHIYOU**Inventor(s):** ORENSTEEN BRUCE D MINNESOTA MINING AND ; BRADSHAW THOMAS I MINNESOTA MINING AND ; BRADSHAW THOMAS I MINNESOTA MINING AND P O BOX 334 ; BRADSHAW THOMAS I MINNESOTA MINING AND P O BOX...**Agent(s):** SMART AND BIGGAR**Designated states:** DE FR GB IT NL**8) Family number: 30047012 (US2003017315A)**

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Title: PARTIAL PRINTING OF A SUBSTRATE WITH EDGE SEALED PRINTED PORTIONS

Abstract: This invention relates to the partial printing of a substrate with a plurality of layers to form a partially printed panel. Within each printed portion, at least one layer is applied to the substrate with inexact registration in relation to a second layer. A "control layer" comprising "edge sealing strips" is printed so that, within each printed portion, each edge of the at least two layers with inexact registration is located within the edges of an overlapping edge sealing strip. The edge sealing strips may provide a visual seal or mask at the edges of printed portions, for example to enable the each printed portion to have the desired color rendering within a one-way vision control panel. The invention can comprise the physical sealing of printed portions containing gaseous or liquid fluids or particles in suspension, such as fragrances, medication, environmentally reactive materials or security printing features.

Classifications:

International (IPC 8-9): B32B23/02 B41M1/00 B41M1/18 B41M3/00 B44C3/02 B44C5/04 B44F3/00 (Advanced/Invention); B32B23/00 B41M1/00 B41M1/14 B41M3/00 B44C3/00 B44C5/00 B44F3/00 (Core/Invention)

International (IPC 1-7): B32B23/02 B32B3/00 B41M B41M1/00 B41M1/18 B41M3/00 B44C1/17 B44C5/04 B44F1/04 B44F1/06

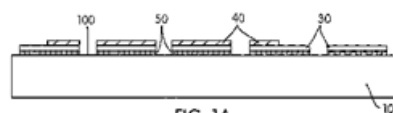
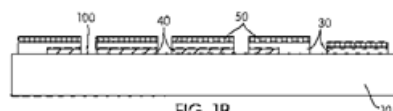
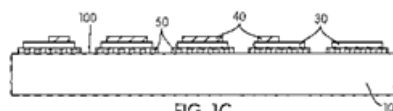
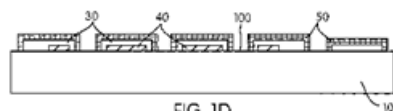
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European: B41M1/18 B41M3/00R B44C3/02 B44C5/04L B44F3/00 L41M3/00P

US: 156/107 428/187 428/194 428/195 428/195.1 428/202

PatBase - US2003017315_AA

Patent Application Publication Jan. 23, 2003 Sheet 1 of 29 US 2003/0017315 A1

FIG. 1A
PRIOR ARTFIG. 1B
PRIOR ARTFIG. 1C
PRIOR ARTFIG. 1D
PRIOR ART**Family:**

Publication number	Publication date	Application number	Application date
AT460291 E	20100315	AT20020726362T	20020118
AU2002256841 AA	20020919	AU20020256841	20020118
AU2002256841 BB	20060914	AU20020256841	20020118
DE60235624 D1	20100422	DE20026035624	20020118
EP1392526 A2	20040303	EP20020726362	20020118
EP1392526 B1	20100310	EP20020726362	20020118
US2003017315 AA	20030123	US20010764276	20010119
US2004091680 AA	20040513	US20030466537	20031219
US6506475 BA	20030114	US20010764276	20010119
US7087291 BB	20060808	US20020466537	20020118
USRE40024 E	20080122	US20050034445	20050113
WO02070269 A2	20020912	WO2002IB01549	20020118
WO02070269 A3	20031127	WO2002IB01549	20020118
ZA200207417 A	20040325	ZA20020007417	20020916

Priority:US20010764276 20010119
US20050034445 20050113

US20020764276 20020118

WO2002IB01549 20020118

Probable Assignee: CONTRA VISION LTD**Assignee(s):** (std): CONTRA VISION LTD ; HILL G ROLAND ; HILL ROLAND G**Assignee(s):** CONTRA VISION LIMITED**Inventor(s):** (std): ROLAND G HILL ; HILL ROLAND G ; HILL ROLAND ; HILL G ROLAND**Agent(s):** FISHER ADAMS KELLY PTY LTD; FISHER ADAMS KELLY CALLINANS; SPRUSON AND FERGUSON; FISHER ADAMS KELLY; WILSON GUNN; PILLSBURY WINTHROP SHAW PITTMAN LLP**Designated states:** AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LI LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NE NL NO NZ OM PH PL PT RO RU SD SE SG SI SK SL SN SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VN YU ZA ZM ZW**9) Family number: 30995593 (US3388027A)**

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Title: GRAPHIC MATERIALS INCORPORATING MICROSPHERE DISTRIBUTIONS FOR THE PRESENTATION OF VISUAL INFORMATION**Abstract:** ABSTRACT OF THE DISCLOSURE

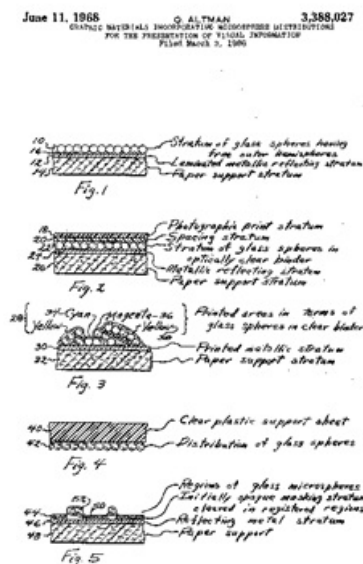
Visual products for the display of images are provided with strata of microspheres of selected optically operative characteristics. The distribution of the microspheres, by virtue of their small size, area concentration, refractive index and optically clear bond to their support, operates to control diffused and concentrated light for projection and observation. Background and summary of the invention

Classifications:**International (IPC 8-9):** B41M1/36 B41M5/26 B41M5/42 G02B5/12 G02B5/128 G03B21/06 G03B21/132 G03C1/76 G03C8/42 G03C8/52 G03G5/10 G03G5/14 G03G9/08 (Advanced/Invention);

B41M1/26 B41M5/26 B41M5/40 G02B5/12 G03B21/06 G03B21/132 G03C1/76 G03C8/00 G03G5/10 G03G5/14 G03G9/08 (Core/Invention)

International (IPC 1-7): B41M1/36 B41M5/26 G01D15/34 G03B21/06 G03B21/60 G03B23/06 G03C1/76 G09F1/10 G09F13/16**CPC:** B41M1/36 B41M5/26 Y10S353/04 Y10S428/918 Y10S430/147 B41M5/426 G02B5/12 G02B5/128 G03B21/06 G03B21/132 G03C1/76 G03C8/42 G03C8/52 G03G5/10 G03G5/14 G03G9/08 G03G9/0825**European:** B41M5/26 B41M5/40C6**US:** 161/4 24/33B 250/315.3 250/329 352/232 353/120 353/66 353/DIG.4 359/452 359/530 359/536 359/540 40/158 40/582 428/29 428/918 430/14 430/155 430/158 430/159 430/21 430/272.1 430/395 430/496 430/510 430/531 430/538 430/644 430/946

PatBase - US3388027_A

**Family:**

Publication number	Publication date	Application number	Application date
BE671209 A	19660421		19651021
GB1124305 A	19680821	GB19650043686	19651014
US3222986 A	19651214	US19640349853	19640306
US3269839 A	19660830	US19630249351	19630104
US3331688 A	19670718	US19640349854	19640306
US3388027 A	19680611	US19660531298	19660302
US3430375 A	19690304	US19650477844	19650806
USB322986 I	00000000		00000000

Priority:US19620249351 19620104
US19640349853 19640306
US19660531298 19660302US19630249351 19630104
US19650477844 19650806US19640349854 19640306
GB19650043686 19651014**Probable Assignee:** GERALD ALTMAN**Assignee(s):** (std): ALTMAN GERALD ; GERALD ALTMAN**Inventor(s):** (std): GERALD ALTMAN ; ALTMAN GERALD

Title: PRINTED IMAGE-SET RETROREFLECTIVE SHEETING

Abstract: This invention provides a retroreflective sheeting which at least comprises a printed image-incorporated retroreflective sheeting and an optical element array sheet in which a large number of light-transmissive optical elements are regularly disposed at least at a fixed location; more particularly a printed image-incorporated retroreflective sheeting which reveals a stereoscopic image when the printed image is seen through a lenticular lens sheet or a convex lens array sheet; and a reflective sheeting which uses the stereoscopic image for tamper prevention.

Classifications:

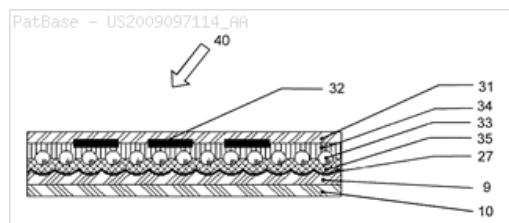
International (IPC 8-9): B41M3/14 G02B27/22 G02B5/12 G02B5/128 G02B5/13 G03B35/00 G09F19/12 G09F9/00

H04N13/00 (Advanced/Invention);
G02B27/22 G02B5/12 G03B35/00 G09F19/12 G09F9/00
H04N13/00 (Core/Invention)

CPC: G02B5/128 G02B5/13 G02B27/2214 G02B27/2221 G03B21/60 G09F3/0292

European: G02B27/22L G02B27/22P G02B5/128 G02B5/13 G03B21/60 G09F3/02D2

US: 359/463 359/463P 359/538 359/619 359/619S

**Family:**

Publication number	Publication date	Application number	Application date
AT502316 E	20110415	AT20060731935T	20060411
CN100570413 C	20091216	CN200680020791	20060411
CN101194189 A	20080604	CN200680020791	20060411
DE602006020712 D1	20110428	DE200660020712T	20060411
EP1879057 A1	20080116	EP20060731935	20060411
EP1879057 A4	20080625	EP20060731935	20060411
EP1879057 B1	20110316	EP20060731935	20060411
ES2359934 T3	20110530	ES20060731935T	20060411
JP2006109880 A1	20081120	JP20070513043T	20060411
JP4800302 B1	20111026	JP20070513043T	20060411
JP4800302 B2	20111026	JP20070513043	20060411
US2009097114 AA	20090416	US20060910794	20060411
US8147075 BB	20120403	US20060910794	20060411
WO06109880 A1	20061019	WO2006JP307999	20060411

Priority:

JP20050113097 20050411 JP20070513043 20060411 WO2006JP307999 20060411
WO2006JP07999 20060411

Probable Assignee: NIPPON CARBIDE KOGYO KK

Assignee(s): (std): MIMURA IKUO ; NIPPON CARBIDE KOGYO KK ; TAKAYAMA KEIZO

Assignee(s): NIPPON CARBIDE KOGYO K K ; NIPPON CARBIDE KOGYO KABUSHIKI KAISHA

Inventor(s): (std): IKUO MIMURA ; KEIZO TAKAYAMA ; MIMURA IKUO ; TAKAYAMA KEIZO

Agent(s): ALBRECHT THOMAS; FITZPATRICK CELLA HARPER AND SCINTO

Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LC LI LK LR LS LT LU LV LY MA MC MD MG MK ML MN MR MW MX MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RU SC SD SE SG SI SK SL SM SN SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW

Title: MULTILAYER GRAPHIC ARTICLE WITH COLOR LAYER

Abstract: A multilayer graphic article comprises a substrate, at least one color layer disposed on the substrate, and a protective surface layer that overlies the substrate and the color layer. The color layer is visible through the surface layer and comprises a color agent in a copolymeric binder. The binder comprises the copolymerization product of an olefinic monomer and a second monomer having a pendant carboxyl group. The substrate may be a polymeric film, an adhesive or a temporary, removable liner. The protective surface layer may be formulated to impart interior surface protection properties to the graphic article or it may be formulated to render the graphic article weatherable and resistant to chemical exposure.

Classifications:

International (IPC 8-9): B32B27/00 B32B27/06 B32B7/06 B41M5/00 B41M5/035 B41M5/34 B41M5/36 B41M5/382 B41M5/392 B41M5/395 B41M5/40 B41M5/41 B41M5/42 B41M5/44 B41M5/50 B41M5/52 B41M7/00 B44C1/17 B44C5/04 B44F1/02 B44F1/04 B60R13/10 C08F20/06 C08F8/30 C08G59/42 C08J3/24 C08J7/04 C08K3/00 C08L23/00 C08L23/02 C08L23/08 C08L33/00 C08L33/02 C08L61/28 C08L75/00 C08L75/04 C09J123/08 G02B5/122 G02B5/124 G02B5/128 G09F7/00 G09F7/16 (Advanced/Invention);

B41M5/00 B41M5/34 B41M5/36 B41M5/40 B41M5/41 B41M5/42 B41M5/50 B41M7/00 (Advanced/Non-invention);
B32B27/06 B41M5/035 B41M5/26 B41M5/50 B44C1/17 B44C5/00 B44F1/00 B60R13/00 C08L23/00 C08L75/00 C09J123/00 G02B5/12 G09F7/00 (Core/Invention);
B41M5/00 B41M5/34 B41M5/40 B41M7/00 (Core/Non-invention)

International (IPC 1-7): B32B27/00 B32B27/06 B32B7/06 B32B33/00 B32B7/06 B32B7/12 B41M05/38 B41M5/00 B41M5/36 B41M5/38 B41M5/40 B44C01/17 B44C1/17 B44C5/04 B44C5/04 B44F01/02 B44F1/02 B60R13/10 C08F120/02 C08F20/02 C08F20/62 C08F8/30 C08G59/42 C08J3/24 C08J7/04 C08K3/00 C08K3/00 C08L23/02 C08L23/08 C08L33/00 C08L33/02 C08L61/28 C08L75/04 C09J123/08 C09J123/08 G02B05/124 G02B05/128 G02B5/122 G02B5/124 G02B5/128 G02B51/24 G09F13/16 G09F7/00 G09F7/16



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US: 427/146 427/385.5 428/195 428/32.85 428/334 428/354 428/40 428/40.9 428/41.6 428/423.1 428/423.3 428/424.2 428/424.8 428/480 428/483 428/500 525/329.7 525/329.9

Family:

Publication number	Publication date	Application number	Application date
 AU199532013 A1	19960222	AU19950032013	19950726
 AU199734886 A1	19980220	AU19970034886	19970620
 AU712878 B2	19991118	AU19970034886	19970620
 BRPI9307599 A	19990615	BR1993PI07599	19931130
 BRPI9710750 A	19990817	BR1997PI10750	19970620
 CA2149030 AA	19950509	CA19932149030	19931130
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 CA2260975 AA	19990113	CA19972260975	19970620
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 CN1394757 A	20030205	CN20011043743	20011217
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 DE69707134 D1	20011108	DE19976007134	19970620
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 EP0914259 A2	19990512	EP19970931186	19970620
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 ES2092886 T3	19961201	ES19940902445T	19931130
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 JP2000517353 T2	20001226	JP19980508790T	19970620
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 JP8504520 T2	19960514	JP19940514217T	19931130
 KR100287357 B1	20010502	KR19950702340	19950609
 KR100494826 B1	20050614	KR19997000548	19970620
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 KR20000029512 A	20000525	KR19997000548	19970620
 MX9307746 A1	19940729	MX19930007746	19931208
 MX9700583 A1	19970531	MX19970000583	19950726
 US5468532 A	19951121	US19920988759	19921210
 US5977263 A	19991102	US19960687312	19960725
 US6156442 A	20001205	US19990362539	19990728
 WO9413496 A1	19940623	WO1993US11530	19931130
 WO9603285 A1	19960208	WO1995US09466	19950726
 WO9804419 A2	19980205	WO1997US10370	19970620
 WO9804419 A3	19980507	WO1997US10370	19970620
 ZA9705960 A	19990125	ZA19970005960	19970703

Priority:

US19920988759 19921210	WO1993US11530 19931130	US19940280467 19940726
US19940280467 19940726	US19950506926 19950726	WO1995US09466 19950726
US19960687312 19960725	WO1997US10370 19970620	US19990362539 19990728

Probable Assignee: 3M CO

Assignee(s): (std): MINNESOTA MINING AND MFG ; 3M INNOVATIVE PROPERTIES CO ; MINNESOTA MINNING AND MFG COMP ; 3M CO

Assignee(s): 3M COMPANY ; SAWKA RAYMOND MICHAEL ; PHILLIPS NANCY H ; POSS STEVE E ; NGUYEN THANH HUONG T ; MINNESOTA MINNING AND MFG CO ; 3M INNOVATIVE PROPERTIES COMPANY ; MINNESOTA MINING AND MANUFACTURING COMPANY ; MINNESOTA MINING AND MANUFACTURING CO ; MINNESOTA MINING AND MFG CO SAINT PAUL ; MINNESOTA MINING AND MFG CO ; MINNESOTA MINING AND MFG CO SAINT PAUL MINN US ; MINNESOTA MINING AND MFG CO ST PAUL ; MCMULLEN CARL W ; HO CHIA TIE ; BAILEY TERRY R ; MINNESOTA MINNING AND MANUFACTURING COMPANY

Inventor(s): (std): MACMULLEN CARL ; MACMULLEN CARL W ; MCMULLEN CARL W ; NGUYEN THANH HUONG ; NGUYEN THANH HUONG T ; PHILIPS N H ; PHILLIPS NANCY H ; PHILLIPS N H ; PHILLIPS N H ; PHILLIPS NANCY ; PHILLIPS NANCY H ; PHILLIPS NANCY HELEN ; POSS STEVE E ; POSS STEVEN ; POSS STEVEN E ; SAWKA RAYMOND ; SAWKA RAYMOND M ; SAWKA RAYMOND MICHAEL ; BAILEY TERRY ; BAILEY TERRY R ; HO CHIA TIE

Inventor(s): HO CHIA TIE SAINT PAUL MN 55133 3427 US ; CARL W MCMULLEN ; CHIA TIE HO ; STEVEN E POSS ; TERRY R BAILEY ; THANH HUONG T NGUYEN ; NH PHILLIPS ; NH PHILLIPS ; RAYMOND M SAWKA ; N H PHILLIPS ; N H PHILLIPS ; NANCY H PHILLIPS ; NANCY H PHILLIPS ; NANCY HELEN PHILLIPS

Agent(s): DAVIES COLLISON CAVE; DAVIES COLLISON CAVE PTY LTD; SMART AND BIGGAR

Designated states: AL AM AT AU AZ BA BB BE BF BG BJ BR BY CA CF CG CH CI CM CN CU CZ DE DK EE ES FI FR GA GB GE

12) Family number: 45945558 (US2011228391A)

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Title: PROTECTIVE OVERLAY BEARING A GRAPHIC AND RETROREFLECTIVE ARTICLES COMPRISING THE OVERLAY

Abstract: A transfer article, a retroreflective article and methods of making the same. The transfer article can include an overlay. The retroreflective article can include an optical layer and an overlay. The optical layer can include a front surface and a rear surface, and can include retroreflective optical elements. The overlay can include a front surface and a rear surface adapted to be coupled to the front surface of a substrate, such as the optical layer. The overlay can further include a graphic, such that the graphic is buried with respect to the front surface of the overlay. A method of making the retroreflective article can include applying a graphic to the rear surface of the overlay, and coupling the overlay bearing the graphic to the front surface of a substrate, such as the optical layer.

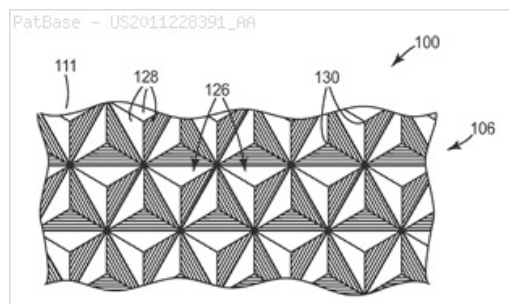
Classifications:**International (IPC 8-9):** B29D11/00 B32B7/02 B41M5/00 G02B5/12

G02B5/122 G02B5/124 G02B5/128 (Advanced/Invention);

G02B5/122 (Advanced/Non-invention);

G02B5/12 (Core/Invention);

B41M5/00 G02B5/122 (Core/Non-invention)

CPC: G02B5/124 G02B5/128**European:** G02B5/124**US:** 264/1.9 264/1.900S 359/529 359/529P**Family:**

Publication number	Publication date	Application number	Application date
CA2745875 AA	20100708	CA20092745875	20091120
CN102272638 A	20111207	CN200980154261	20091120
CN102272638 B	20140430	CN200980154261	20091120
EP2368147 A2	20110928	EP20090836611	20091120
EP2368147 A4	20180124	EP20090836611	20091120
JP2012511178 T2	20120517	JP20110539585T	20091120
KR20110098781 A	20110901	KR20117015498	20091120
KR20170004017 A	20170110	KR20167036338	20091120
TW201030387 A	20100816	TW20090141395	20091203
TWI502226 B	20151001	TW20090141395	20091203
US2011228391 AA	20110922	US20090130844	20091120
US8506095 BB	20130813	US20090130844	20091120
WO10077475 A2	20100708	WO2009US65231	20091120
WO10077475 A3	20100826	WO2009US65231	20091120

Priority:

US20080120696P 20081208

US20090130844 20091120

WO2009US65231 20091120

Probable Assignee: 3M CO**Assignee(s):** (std): 3M CO ; 3M INNOVATIVE PROPERTIES CO ; CORN STEWART H ; RAY BRADLEY R ; BACON CHESTER A JR ; CHEESEBROW THOMAS G ; PETRICH MICHAEL J ; BACON JR CHESTER A ; SKOGLAND TIMOTHY S**Assignee(s):** 3M INNOVATIVE PROPERTIES COMPANYUS ; 3M INNOVATIVE PROPERTIES COMPANY ; BACON CHESTER A**Inventor(s):** (std): BACON CHESTER ARTHUR ; BACON CHESTER ARTHUR JR ; BACON JR CHESTER A ; CHEESEBROW THOMAS GREGORY ; CORN STEWART HENRY ; PETRICH MICHAEL JAMES ; RAY BRADLEY ROBERT ; SKOGLAND TIMOTHY S ; RAY BRADLEY R ; PETRICH MICHAEL J ; CORN STEWART H ; CHEESEBROW THOMAS G ; BACON CHESTER A JR ; SKOGLAND TIMOTHY SCOTT**Inventor(s):** BACON CHESTER A**Agent(s):** SMART AND BIGGAR; REINHARD SKUHRA WEISE AND PARTNER GBR; NICOLE J; EINERSON NICOLE J ET AL**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW**13) Family number: 48763941** (US2012200710A)

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Title: PRISMATIC RETROREFLECTIVE SHEETING WITH REDUCED RETROREFLECTIVITY OF INFRA-RED LIGHT

Abstract: The present application relates to retroreflective sheeting that is capable of use in a license plate and that can be accurately read and/or detected by an ALPR system. The retroreflective sheeting is a prismatic retroreflective sheeting that provides reduced retroreflectivity of infra-red light. The retroreflective sheeting can also be a prismatic retroreflective sheeting that exhibits reduced retroreflectivity of incident infra-red light and substantially unaffected retroreflectivity of incident visible light.

Classifications:**International (IPC 8-9):** B60R13/10 F21V7/00 F21V7/22 G02B5/122

G02B5/124 G02B5/20 G08G1/017 H04N7/18 (Advanced/Invention);

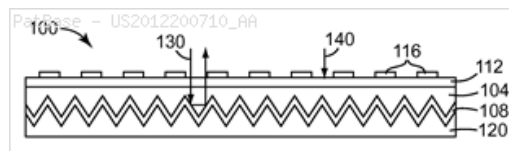
B60R13/10 C08K5/3437 G01J3/00 G02B5/20 G06K19/06 (Advanced/Non-

invention)

CPC: G02B5/124 B60R13/10 G02B5/208 G08G1/017

European: G02B5/124 L60R13/10 S02B5/20V

US: 348/148 348/148P 348/E7.085 348/E70.85S 359/350 359/350S 359/530 359/530S 359/533 359/533S



Family:

Publication number	Publication date	Application number	Application date
JP2013508749 T2	20130307	JP20120534290T	20101012
JP5671047 B2	20150218	JP20120534290T	20101012
KR101741863 B1	20170530	KR20127012273	20101012
KR20120091205 A	20120817	KR20127012273	20101012
US2012200710 AA	20120809	US20100502251	20101012
US9519087 BB	20161213	US20100502251	20101012
WO11046957 A2	20110421	WO2010US52363	20101012
WO11046957 A3	20111027	WO2010US52363	20101012

Priority:

US20090252244P 20091016 US20100502251 20101012 WO2010US52363 20101012

Probable Assignee: 3M CO

Assignee(s): (std): 3M CO ; 3M CO MINNESOTA MINING AND MFG COMPANY ; 3M INNOVATIVE PROPERTIES CO ; NAKAJIMA TOSHITAKA ; MURAMOTO AKIRA ; YOKOYAMA MASAMI

Assignee(s): 3M INNOVATIVE PROPERTIES COMPANY

Inventor(s): (std): MURAMOTO AKIRA ; NAKAJIMA TOSHITAKA ; YOKOYAMA MASAMI

Agent(s): NOWAK SANDRA K ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

14) Family number: 68579782 (US2018043704A)

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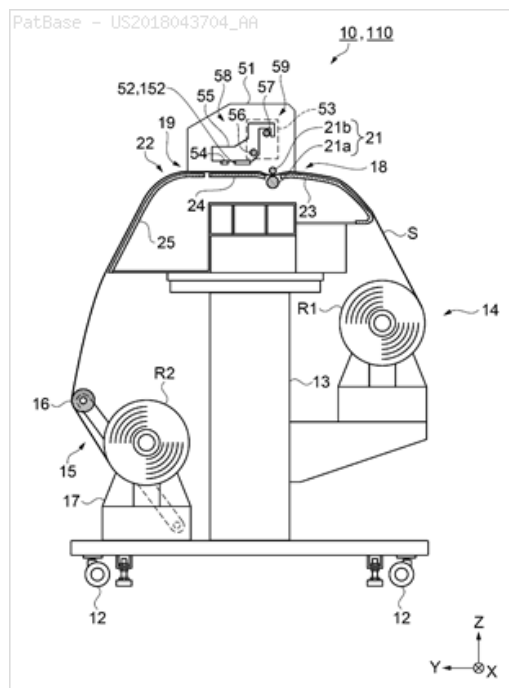
Title: RECORDING APPARATUS

Abstract: A recording apparatus includes a light irradiation unit configured to emit light for curing photocurable ink to a recording medium, and a head having a nozzle formation surface in which nozzles for discharging the photocurable ink onto the recording medium are formed. A retroreflection surface is provided on at least a part of a arrival region at which the light emitted from the light irradiation unit arrives.

Classifications:

International (IPC 8-9): B41J11/00 B41J2/01 B41J2/165 B41M7/00 (Advanced/Invention)

CPC: B41J11/002 B41M7/0072 B41J2/16511 B41J2/165



Family:

Publication number	Publication date	Application number	Application date
CN107696701 A	20180216	CN201710670448	20170808
JP2018024132 A2	20180215	JP20160156220	20160809
US2018043704 AA	20180215	US20170671655	20170808

Priority:

JP20160156220 20160809

Probable Assignee: SEIKO EPSON CORP

Assignee(s): (std): SEIKO EPSON CORP

Inventor(s): (std): MIZUNO RYUKICHI ; TAKAYOSHI MIZUNO ; MIZUNO TAKAYOSHI