

(19) (KR)
(12) (A)

(51) . Int. Cl. 7
B42D 15/00
B44F 1/12

(11)
(43)

10-2004-0106311
2004 12 17

(21) 10-2004-7015639
(22) 2004 10 01
2004 10 01
(86) PCT/EP2003/003483
(86) 2003 04 03

(87) WO 2003/084766
(87) 2003 10 16

(30) 10216561.0 2002 04 05 (DE)

(71) - 6301 , 12

(72) , - 6332, 24

, , - 6300, 28A

, ,
, -5400,

(74)

1

(54) 가

1

(Security Element)

d)

,
 (thin layer composite)
 (light-modifying relief structures),
 (cut out),
 (embeded)

가

(carrier film)

4,856,857

2 129 739A

05 099

0 429 792 B1

가

가

0 1

profile)

가

가

(adjoining portion)

(embossing)

(security

(punch)

가

(seal)

가

가

(x,y)

가
(M)

(x,y)

0.1 mm
(M)가
(portion-wise steady)0.4 mm
가

1

2

3

4a 4b (matt)

5 (additive superimposition)

6 2

7a 7c (tilt angle)

$$\begin{aligned} M(x,y) & \quad (4) \quad & (13)(-10) \\ M(x,y) & = 0.5 \cdot (x^2 + y^2) \cdot K, M(x,y) = a \cdot \{ 1 + \sin(2 F_x \cdot x) \cdot \sin(2 F_x \cdot y) \}, \\ M(x,y) & = a \cdot x^{1.5} + b \cdot x, M(x,y) = a \cdot \{ 1 + \sin(2 F_y \cdot y) \} \end{aligned} \quad (13)$$

$$\begin{aligned}
& \text{b} \quad \text{가} \quad 0^\circ \quad (16) \quad 2 \quad (21) \quad > 0^\circ \quad . \\
& 2 \quad 2 \quad (18) \quad ' = - , \quad 2 \quad (24) \quad (16) \quad 1 = - \\
& 2 \quad . , \quad 3 \quad (22) \quad 3 \quad (19) \quad ' \text{가} \quad () \\
& 16) \quad | \quad | \quad , \quad 3 \quad (25) \quad c \quad < 0^\circ \quad 2 = - 2 = + \\
& \quad \quad (23, 24, 25) \quad (15) \quad (27) \quad (26) \\
& (15) \quad (28) \quad (2)(-1) \quad (1) \text{가} \\
& , \quad 2 \quad (23, 24, 25) \quad (16) \quad , \quad , \quad (26) \\
& \quad (15) \quad (27) \quad (27) \quad (M) \\
& \quad \quad \quad \quad (11) \quad , \quad , \quad (M) \\
& \quad \quad \quad \quad (A) \text{가} \quad (26)
\end{aligned}$$

a), (correlation length)(l_c) (R_a) 200 nm $5 \mu\text{m}$ 가 , 150 nm (1.5 μm 가 . $l_c = 500 \text{ nm}$ $l_c = 100 \mu\text{m}$ 가 . ' ' ' ' , $l_c = 300 \text{ nm}$, $l_c = 300 \mu\text{m}$ 가 , (30) (30) 가 .

(M) (28) , , (27) (5)(2) 가 , (interf 5 nm
 erence layer) 50 nm Al . 3, 100 nm , (11) (5) TiO₂

5 (10), (M)
 M) (13)(4a) (13)가
 (31) x(2) y(2) (relief profile)(R),
 (constant profile) (31) (t) t = 0.05 μm t = - 5 μm 가,
 t = 0.6 ± 0.5 μm (31) (f) f = 2400 /mm
 가, (31), (9)(4a) 가
 , (f) (zero diffraction order), (23)(3)
 A = ((M) modulo H) + (R), (11)(2)
 (31) (t) 50 nm, (M)
 (9) (14) (M)
 (M) (13) (31)

$$6 \quad (2)(-2) \quad , \quad \text{가} \quad (13)(-4a) \quad . \quad (2) \quad 6 \\ (M) \quad M(y) = 0.5 \cdot y^2 + K \quad . \quad (13) \quad (M) \quad M$$

$$(y) = -0.5 \cdot y^2 \cdot K \quad (13) \quad M(y) = 0.5 \cdot y^2 \cdot K^{(13)}, \quad M(y) = -0.5 \cdot y^2 \cdot K \quad 6$$

$$y^2 \cdot K^{7a} \quad K^{7c} \quad , \quad 1 \quad (31) \quad (2) \quad (4)(-1) \quad 6 \quad M(y) = 0.5 \cdot M(y) \\ = -0.5 \cdot y^2 \cdot K \quad 2 \quad 3 \quad (32, 33) \quad \text{grad}(M) \quad , \quad (13)(-4a) \quad K^{(31, 32, 33)} \quad (M) \\ \text{가} \quad z \quad 7a \quad , \quad \text{가} \quad y/z- \quad y/z- \quad = 0^\circ \quad 180^\circ \\ \text{가} \quad , \quad \text{가} \quad y/z- \quad , \quad \text{가} \quad , \quad = \pm 30^\circ$$

$$\text{가} \quad (9)(-4a) \quad (2) \quad , \quad (26)(-3) \quad (27)(-3) \quad (31, 32, 33) \quad (\text{strip})(34) \\) \quad \text{가} \quad , \quad (34) \quad (35, 36) \quad \text{가} \quad , \quad (28) \quad (34) \quad K \\) \quad (11) \quad (A) \quad (11) \quad \text{가} \quad \text{가} \quad (11) \quad (34) \quad (K) \\ (34) \quad (34) \quad , \quad (31, 32, 33) \quad 6 \quad (34) \quad (37)$$

$$7b \quad (2)\text{가} \quad (28) \quad , \quad 2 \quad 3 \quad (13, 15) \quad 1 \quad (14) \quad (4)(-1) \\ (34) \quad (28) \quad (M) \quad , \quad 7b \quad (2) \quad (4) \quad (2) \\ \text{가} \quad , \quad (26)(-3)\text{가} \quad , \quad \text{가} \quad , \quad (11) \quad (2)$$

$$4)(-1) \quad 7c \quad (28) \quad , \quad 7c \quad (\quad) \quad (\\ \text{가} \quad , \quad 1 \quad (31) \quad 2 \quad (32, 33) \quad (2) \\ (4) \quad \text{가} \quad (M) \quad , \quad (4) \quad , \quad , \quad (11) \quad \text{가}$$

(57)

1. $\begin{array}{l} (x,y) \\ (12) \quad \text{가} \\ (4) \quad (6) \end{array}, \quad \begin{array}{l} (7) \\ (13, 31, 32, 33) \end{array}, \quad \begin{array}{l} (1) \quad (6) \\ (11) \quad (6) \end{array}, \quad \begin{array}{l} (6) \quad , \quad (\text{embedded}) \\ (2) \quad , \quad (12) \end{array} \\ 33), \quad 0.1 \text{ mm} \quad (11) \quad 0.4 \text{ mm} \quad \text{가} \quad (M) \quad (13, 31, 32, \\ (x,y) \quad (M) \quad \text{가} \quad , \quad (\text{portion-wise steady}) \quad \text{가} \quad , \quad (2). \end{array}$
2. $\begin{array}{l} 1 \quad , \quad \text{가} \end{array}$

- (4) (31, 32, 33),
 (M) 1 (31), (- M) (32, 33),
 2 (M, - M) (16) 가
 (2).
- 3.**
 1 2 ,
 (M) 5 /mm (F) (2).
- 4.**
 1 2 ,
 (M) (2). 가
- 5.**
 1 4 ,
 (H) (6) (A) modulo (H) (A) (H_{st}) (M) 40 μm (C) , (C) (C) (H_{st}) 1/2
 (H) (H_{st}) , (2).
- 6.**
 1 5 ,
 (M) (x,y) (R) 2400 /mm (R) 가 (f) , 5 μm (31) 가
 (t) 가 , (M) (31) (R)
- 7.**
 1 5 ,
 (M) (x,y) 200 nm 5 μm (R) (Ra) 가 - , (M) 가
 , (2).
- 8.**
 1 7 ,
 (11) (2).
- 9.**
 1 7 ,
 (11) (full-area) / (2).
- 10.**
 1 9 ,
 (1) (6) (5)
 (2).

11.

1 10 ,

(4)

/

(38)

(2).

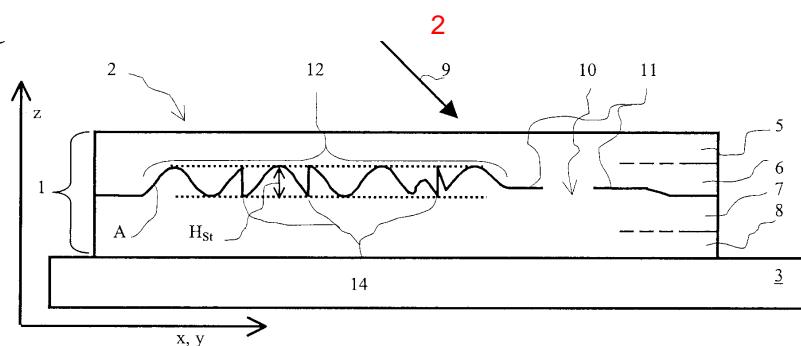
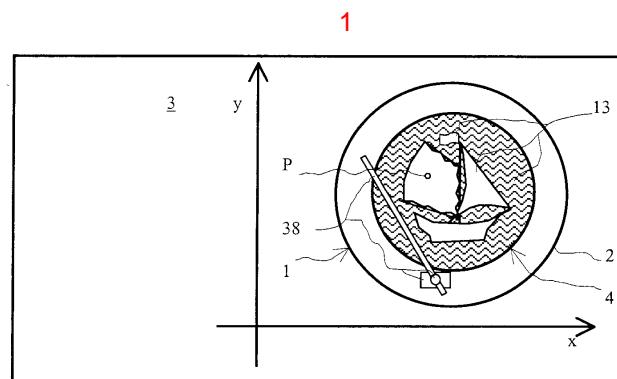
12.

1 11 ,

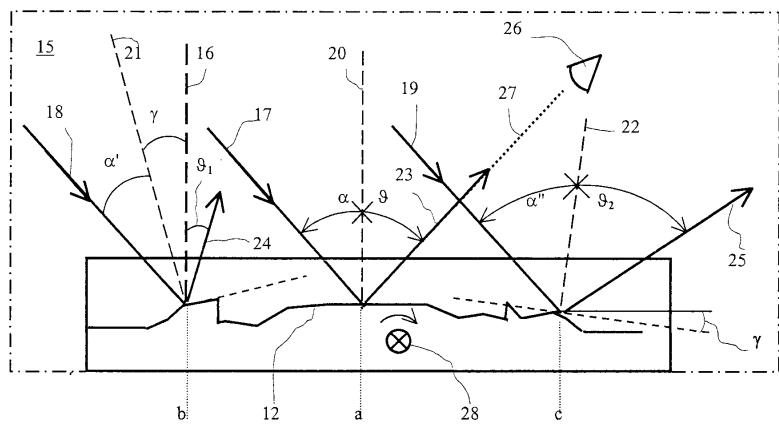
40 μm

↗

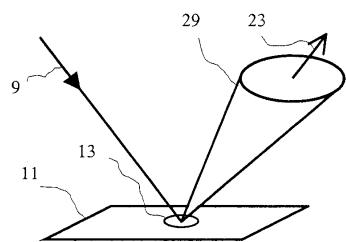
(2).



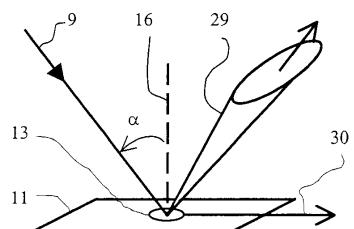
3



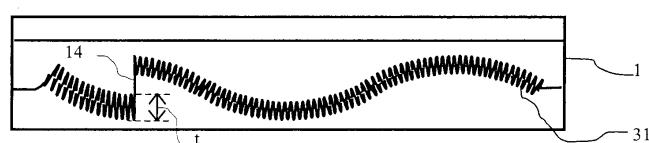
4a



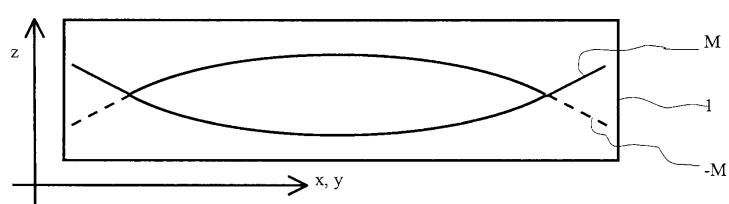
4b



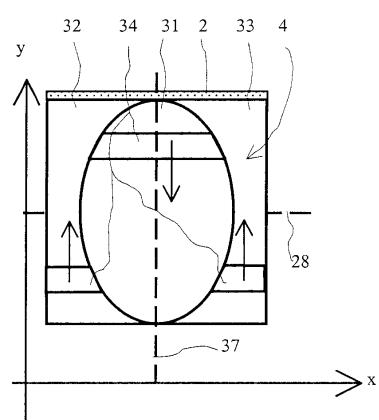
5

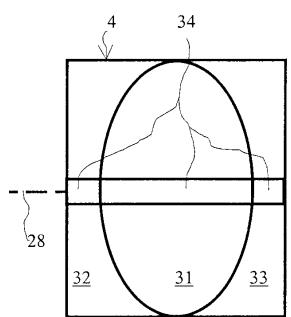


6



7a



7b**7c**