

(19)
(12)

(KR)
(A)

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(43)

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(30) 09/687,465 2000 10 11 (US)

(71) 94089-1208 385 115

(72) , , .
95014 21800

(74)

(54)

2 가

가

3

(speckle)

$$\begin{array}{ccccccccc}
 & & \text{가} & 1 & & (1) & 1 & (8) & (2), \\
 (4) & (6) & . & & (2) & (10) & . & (4) & (10) \\
 & (12) & . & & (12) & (14) & . & (6) & (6) \\
 & & (12) & . & & 2 & (18) & . & (16) \\
 & (16) & . & & & (4) & . & & (6) \\
 , & (16) & (6) & . & & & & &
 \end{array}$$

J.Opt.Soc.A., Vol.66, No.11, Nov.1976, pp1145-1150, 'Some fundamental properties of speckle' Goodma
n N . N . N
가 . N . N . N
N . N . N . N
가 . , . N
가 . , Goodman

Goodman . (19) (19) (6)
(6) ,

가

가

, Goodman

Applied Optics, Vol.37, No.10, Apr. 1998, pp1770-1775 'Speckle reduction in laser projection systems by diffractive optical elements' Wang

) . Wang

(beamlet)

. Wang

Bloom . , GLV
GLV가 2

Bloom 2 , 2

2 가

2 가

2

가

1

2

3

4

가

6A 6B 6C

7A 7B

가

8

GLV(50) (72) +1 -1 , D +1 D -1 , GLV(50) 1080
 R . , GLV(50) 1080 .
 R +1 -1 , D +1 D -1 .
 R , +1 -1 , D +1 D -1 .
 , +1 -1 , D +1 D -1 .
 -1 , R , . , R +1 -1 , D +1 D -1 .

Schlieren (52) 1 2 (82 84) Schlieren (80)
 Schlieren (80) R , +1 -1 , D +1 D -1 Schlieren (80)
 0) . Schlieren (80) 1 (85) . (85) . Schlieren (80)
 en (80) 1 (85) . . (85) . Schlieren (80)

1 2 (82 84), 2 (54) 2 (54)
 +1 -1 , D +1 D -1 R (62) GLV(50) (62)
 GLV(50)

(54) (72) 0 2 π (54)
 (54) (54) 가 , (56)
 가 가 , (54)
 (42)

(92) (86) (56) (86) (88) (88)
 2 (94) (90) (58) (58) 가
 (88) 1 A , 1 A 2 B 1 (58) (58)
 , 2 (90) (90) 가 (88) (58)
 58) . 0 가 (88)

(90) 2 (58) , GLV(50) (HDTV) , GLV(50)
 (90) 가 2 1920 * 1080 , GLV(50)
 HDTV , GLV(50) (90) 가 (58)
 1920

(92) (58) , 가

3, 4 5 (42), 2 가 , 2 (42) 가 , 2 , 가 GLV, 2
 . 2 3가 GLV , , , ,
 ren (52) (92) (54) (54) , , , ,
 (92)) (58) , , , ,
 LV , , , , , , , , , G

109) (54A) (110) 6A 6B (54A) , (106, 108
 5μm 가 27.5mm , (109) 1mm (54A) (54A) 25.
 4mm , (108) 35mm , (109) 가 , (108) (106)
 (54A) , , , , 6A 6B (106) (109)
 (110)

(110) 27.5mm (108) C (110)
 (54A) 27.5mm (86) (88) 90° 가
 , (42)(4 5) (86) (94)(4 5) (88) (88)
 45° 가 45° 2 (58) (92) (42)(4, 5, 6A)
 (110), C, (86) (88) , 45° C
 6B)

6C (110) . (110) 가)
 (54A) 25.5μm (silica)(1.46) 532nm (86) 가 f/25 가

6C

D 4 μm

E 3.5

F 2

G 8.5

H 578nm

$$H = H_0 / [2(n-1)] \quad , \quad (42) \quad (4) \quad 2 \quad (94)$$

(54A)
(54A) 400-700nm BBAR()

$$= (1 + \text{proj2} / \text{eye})^{1/2} / (1 + \text{proj1} / \text{eye})^{1/2}$$

$$\text{proj}_2 = \frac{1}{2} \cdot \dots , \quad (54)$$

eye =

$$(92) \quad \text{total } (x,t) \nabla t \quad (58) \quad ,$$

$$\text{total } (x,t) = \text{screen } (x) + \text{beam } (x - vt)$$

$$\text{screen} =$$

$$\text{beam} =$$

$$x = \quad (58)$$

$$v = \quad (92)$$

$$10\mu s$$

$$, \quad \begin{matrix} 1, & 2, & 3 & 4 \\ 7A & 7B & . & 7A \nabla \end{matrix} \quad , \quad \begin{matrix} 2 \\ (58) \\ (150, 152, 154) \end{matrix} \quad \begin{matrix} 1, & 2, & 3 & 4 \\ 156 & . & 3 & 2 \\ (158) & & & \end{matrix} \quad \begin{matrix} 1, & 2, & 3 \\ (58) \\ (150, 152, 154) \end{matrix} \quad t_1$$

$$1 \quad (t_1) \quad , \quad : \quad$$

$$\Psi(t_1) = A_1 e^{i\phi'} + A_2 e^{i\phi''} + A_3 e^{i\phi'''}$$

$$A_1 = 1 \quad (150) \quad 1$$

$$A_2 = 2 \quad (152) \quad 2$$

$$A_3 = 3 \quad (154) \quad 3$$

$$' = 1 \quad (150) \quad 1$$

$$'' = 2 \quad (152) \quad 2$$

$$''' = 3 \quad (154) \quad 3$$

$$, \quad ' = \quad , \quad '' = \quad '''' = 0 \quad \nabla \quad . \quad , \quad (t_1) \quad : \quad$$

$$(t_1) = -A_1 + A_2 + A_3$$

$$1 \quad (t_1) \quad 1 \quad I(t_1) \quad : \quad$$

$$I(t_1) = (t_1)^2 = A_1^2 + A_2^2 + A_3^2 - 2A_1 A_2 - 2A_1 A_3 + 2A_2 A_3$$

$$7B \quad \begin{matrix} 2, & 3, & t_2 \\ & & 4 \end{matrix} \quad (152, 154) \quad \begin{matrix} (58) \\ 156 \end{matrix} \quad 2 \quad (158) \quad 2 \quad (158)$$

$$2 \quad (t_2) \quad , \quad : \quad$$

$$\Psi(t_2) = A_2 e^{i\phi''} + A_3 e^{i\phi'''} + A_4 e^{i\phi''''}$$

$$A_4 = 3 \quad (156) \quad 3$$

$$'''' = 4 \quad (156) \quad 4$$

, " = , ' ' = ' ' ' = 0 가 . , (t 2)

$$(t_1) = -A_2 + A_3 + A_4$$

$$2 \quad (t_2) \quad 2 \quad l(t_2) \quad \dots$$

$$|t_2| = (t_2)^2 = A_2^2 + A_3^2 + A_4^2 - 2A_2 A_3 - 2A_2 A_4 + 2A_3 A_4$$

$$_1) \quad 1 \quad 1 \quad 2 \quad , \quad l(t_1) \quad l(t_2) \quad 1 \quad l(t_2) \quad , \quad 1 \quad 2 \quad 2 \quad (-2A_2 A_3) \quad l(t_2) \quad , \quad 1 \quad l(t_2)$$

1 GLV(50) , Schlieren 4 (80)
1 (82) ,
1 (82) ,

2 GLV(50) , Schlieren (80)
 2 (82) 1 (82)

3		Schlieren		Schlieren		Schlieren	
D +1	-1	D +1	D -1	Offner	Offner	R R	D +1
D +1	-1	D +1	D -1	(54)			
(139)		가 8			(54B)	1 2	(136 138)
		2					(139)
(42)		(42)(4, 5 8)		(140)			
		,		(90)			
(42)					(54B)		
(136)	138)						
		1	2	(136 138)			
		(4, 5 8)					

1 , 가 (54A) 1 , 가 44%가 가 . . 2
 2.2 , (54A)가 2 , 20%가 . . ,
 (N) (54A)

(40)

가

(57)

1.

?

- a. , ; , ;
- b. 2 , ;
- c. 2 , 가 /
- 2.
- 1 , .
- 3.
- 2 , .
- 4.
- 3 , 2 1 /
- 5.
- 1 , .
- 6.
- 1 , .
- 7.
- 1 , .
- 8.
- 1 , .
- 9.
- 1 , .
- 10.
- 9 , .
- 11.
- 9 , / , ,
- 12.
- 2 , , ;
- a. ;
- b. 가 1 1
- c. , 1 , ;
- d. 2 가 2 ;
- e. 2 ;

f. 2 , 가
3

13. 12 ,

14. 13 , 3

15. 14 , +1 -1

16. 15 ,

17. 12 ,

18. 12 ,

19. 2 , ;

a. ;

b. 가 1 ; 1

c. 1 , , ;

d. 2 , , 2

e. 2 , , 가 ;

f. 가 ;

g. 가 , , 가 2

20. ,

a. 가 ;

b. 가 ;

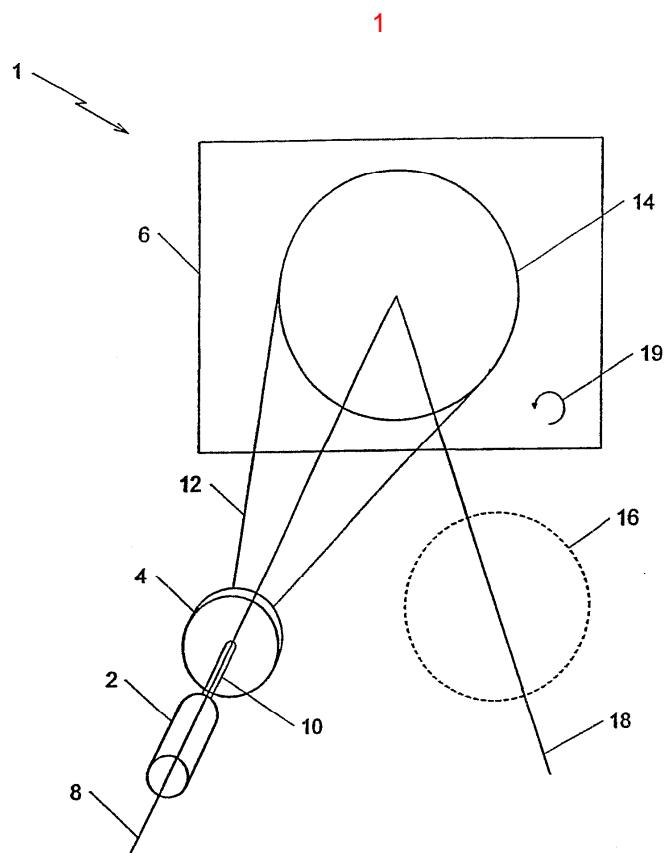
- c. ;
d. ;
e. 2 가

21.

- a. 1 , , 가 ;
b. , /

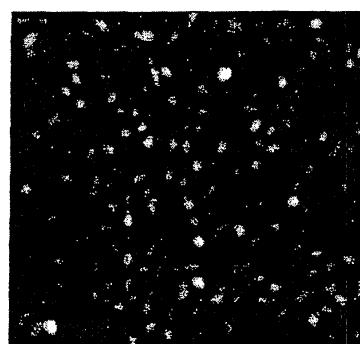
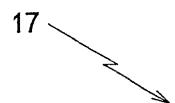
22.

- a. 가 ;
b. ;
c. ;
d.

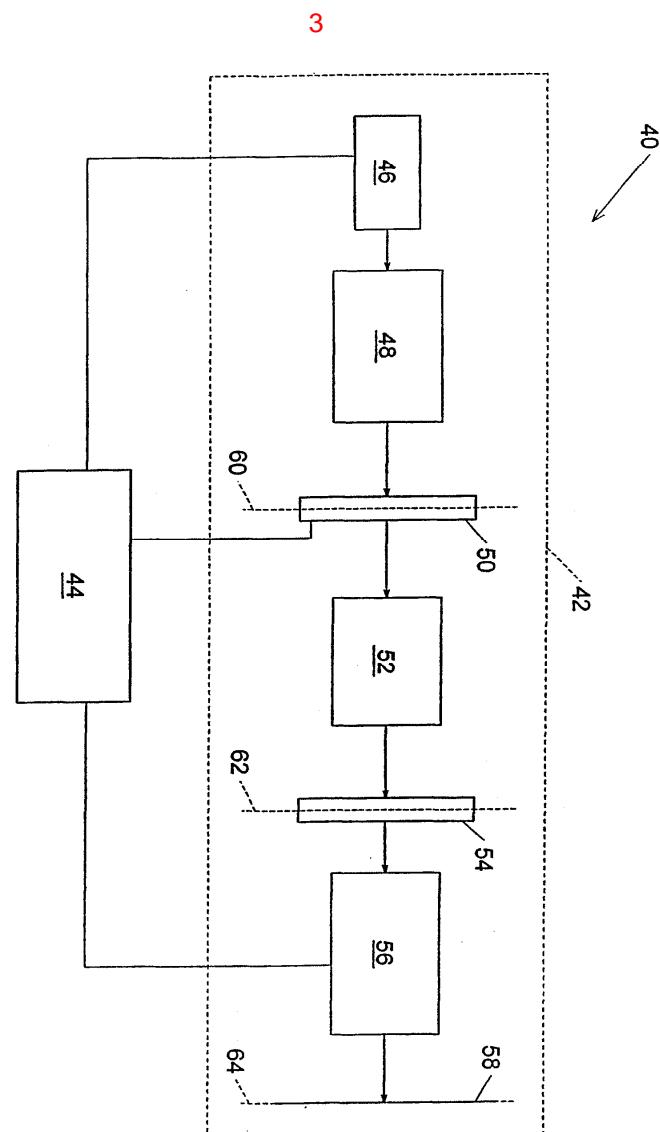


(이전 기술)

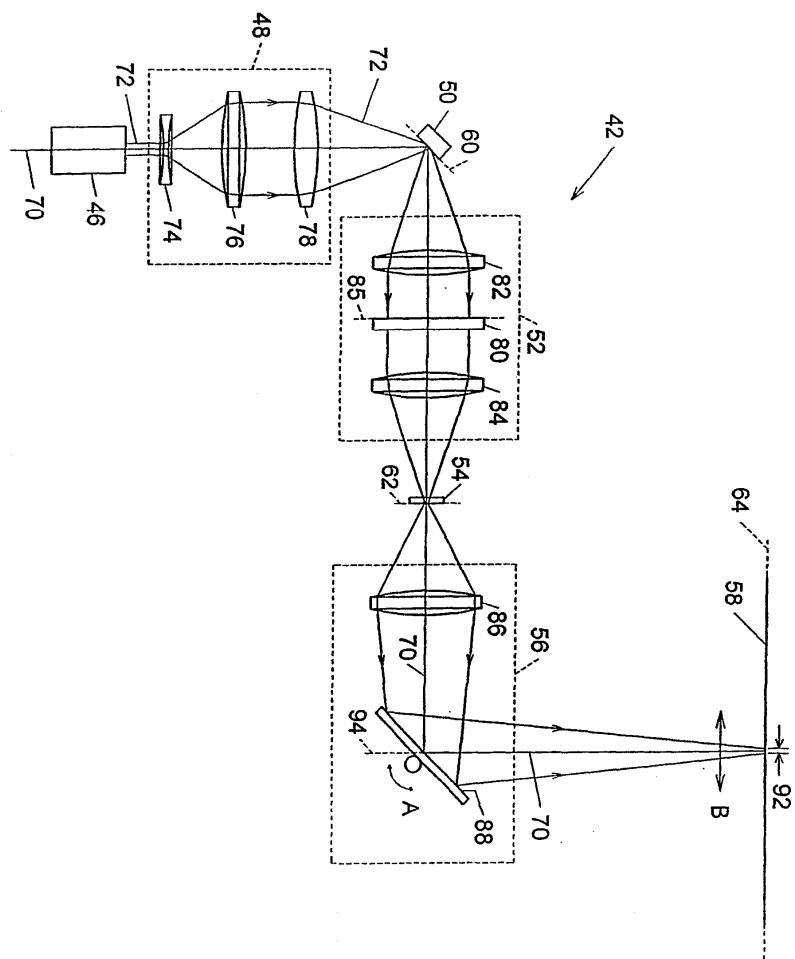
2



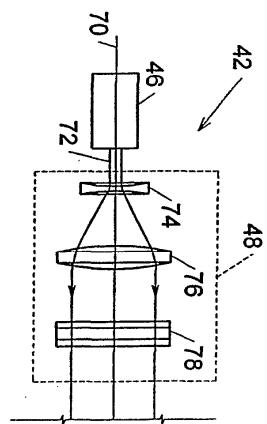
(이전 기술)



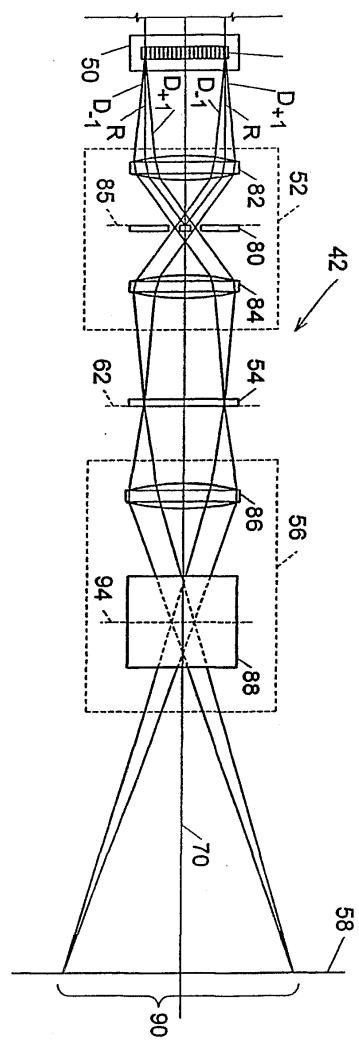
4



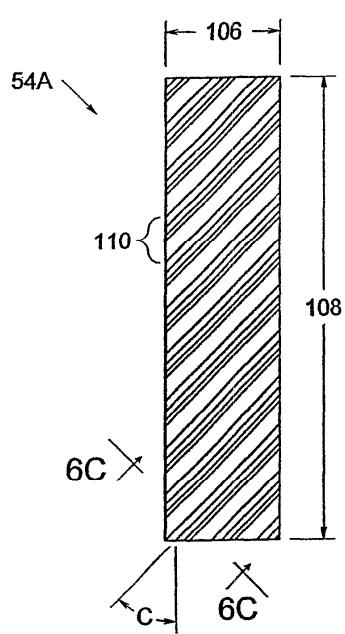
5A



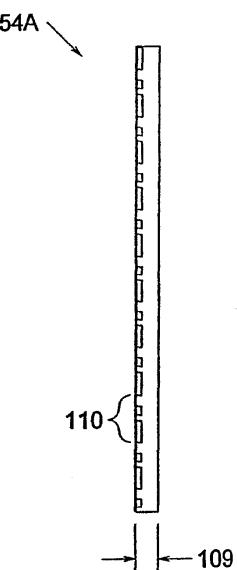
5B



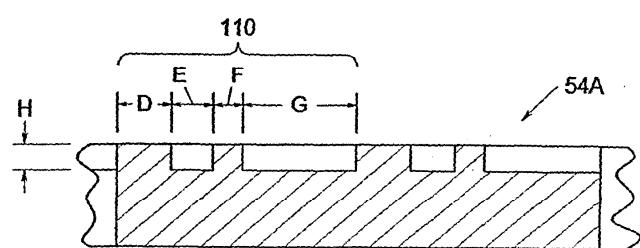
6A



6B



6C



7A

