Fig. 1

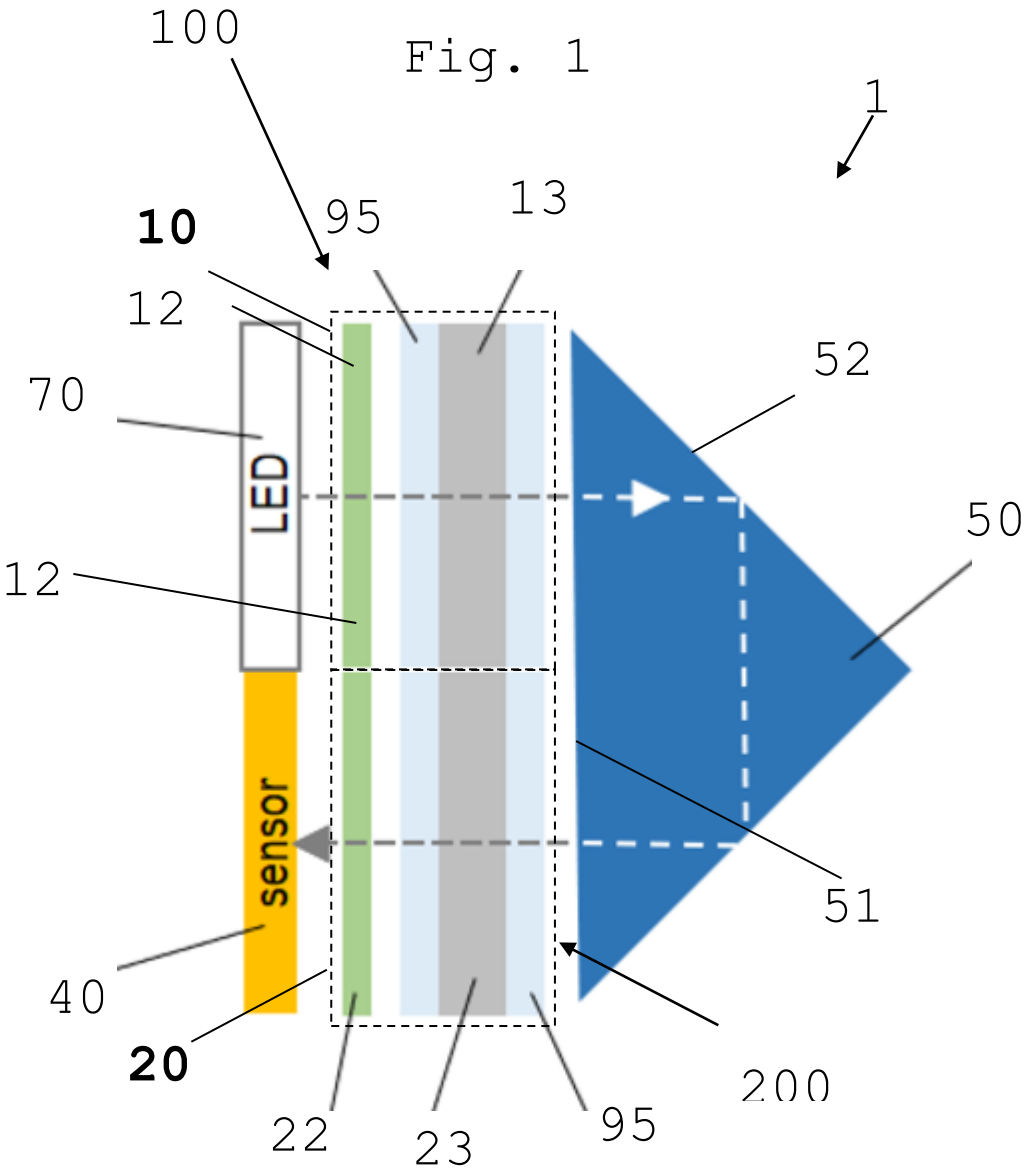


Fig. 2

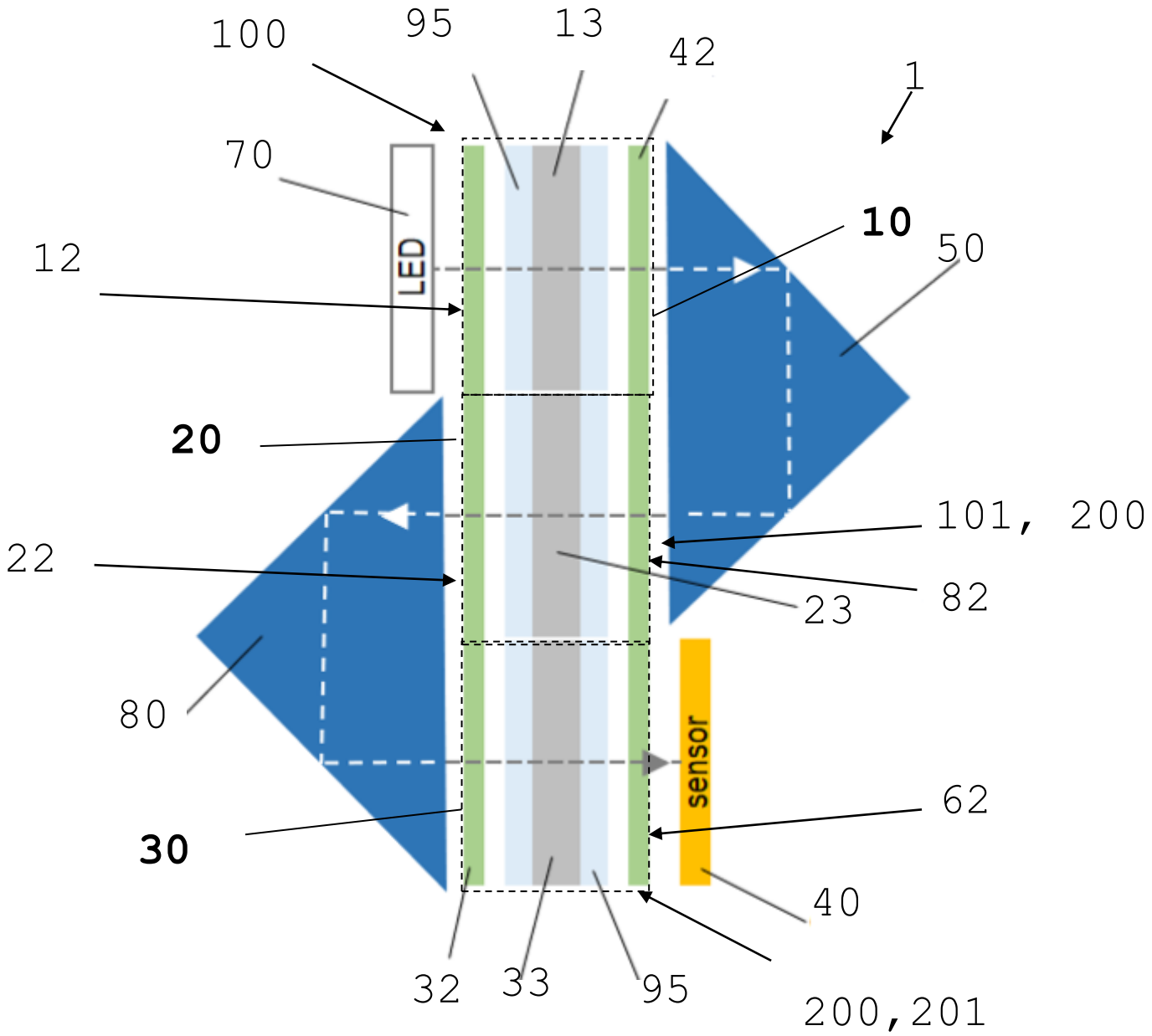

100
95
13
42
1
70
LED
10
50
12
20
101, 200
22
23
82
80
sensor
62
30
40
32
33
95
200,201

Fig. 3

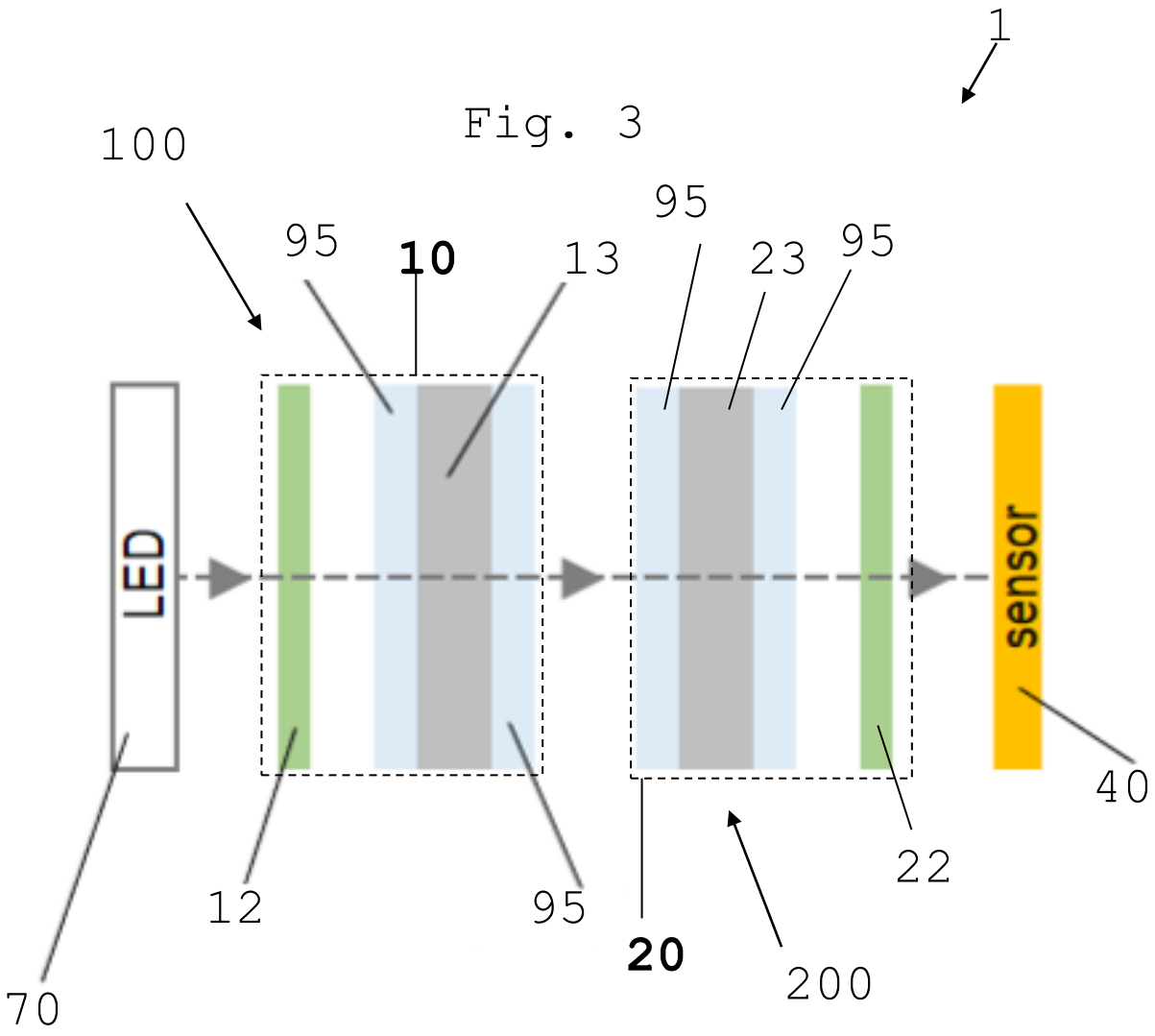


Fig. 4

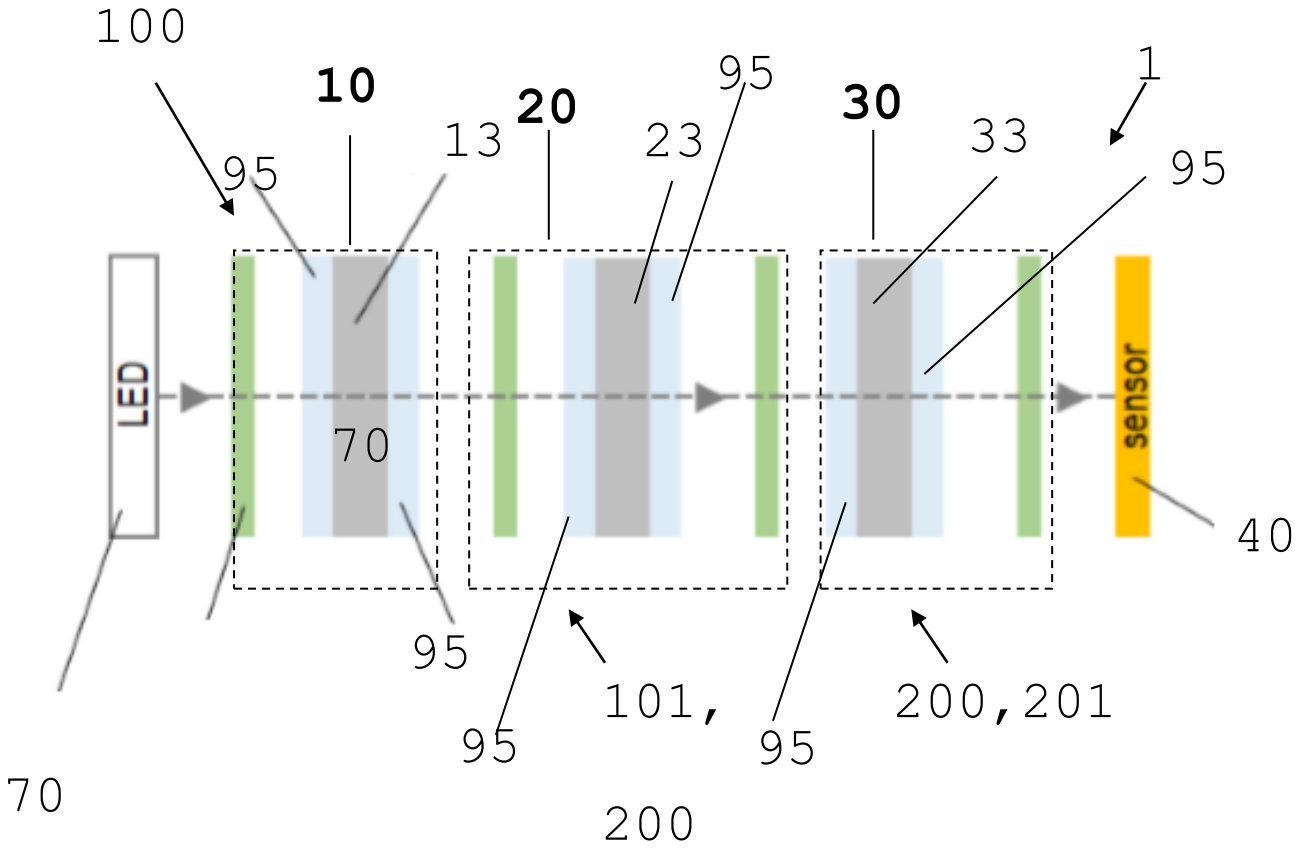

100
10
20
30
1
95
13
23
95
33
95
LED
70
sensor
40
95
101,
200
95
95
200,201
70

Fig. 5

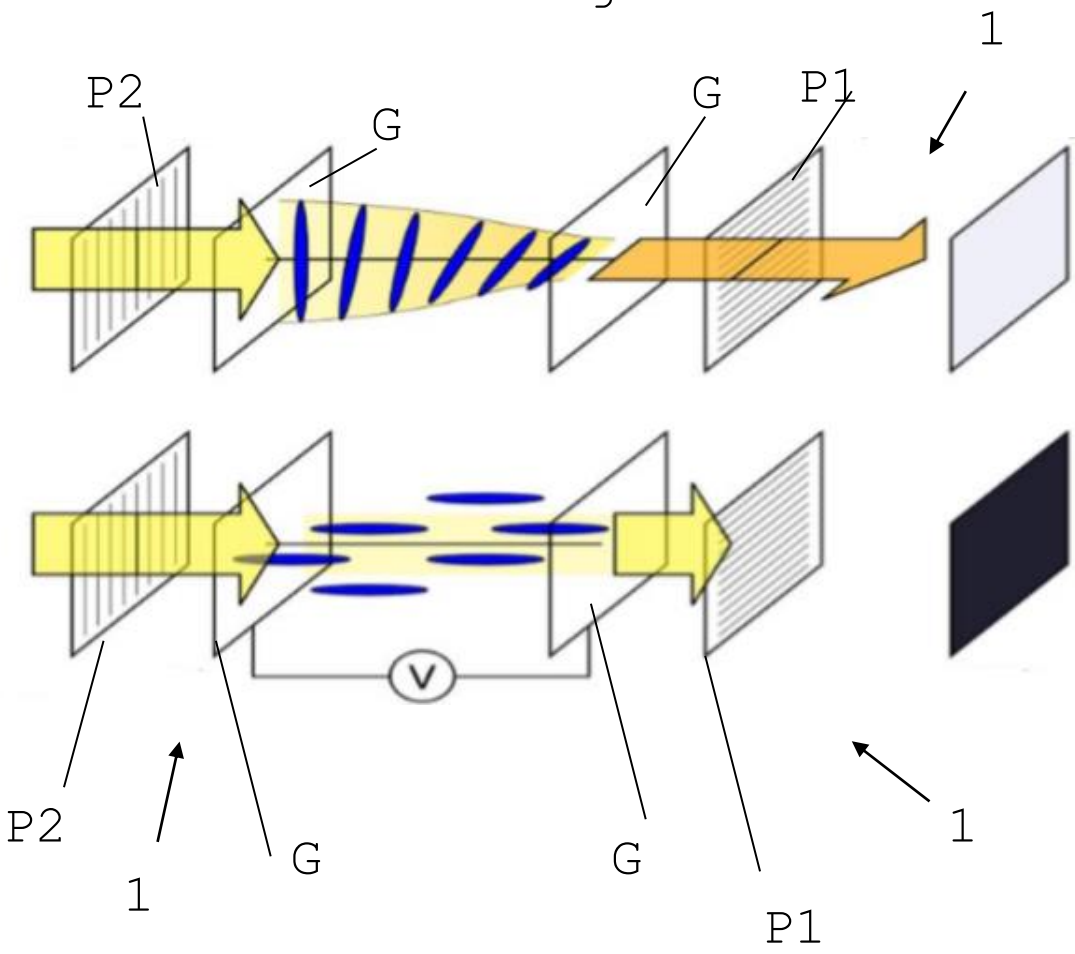


Fig. 6

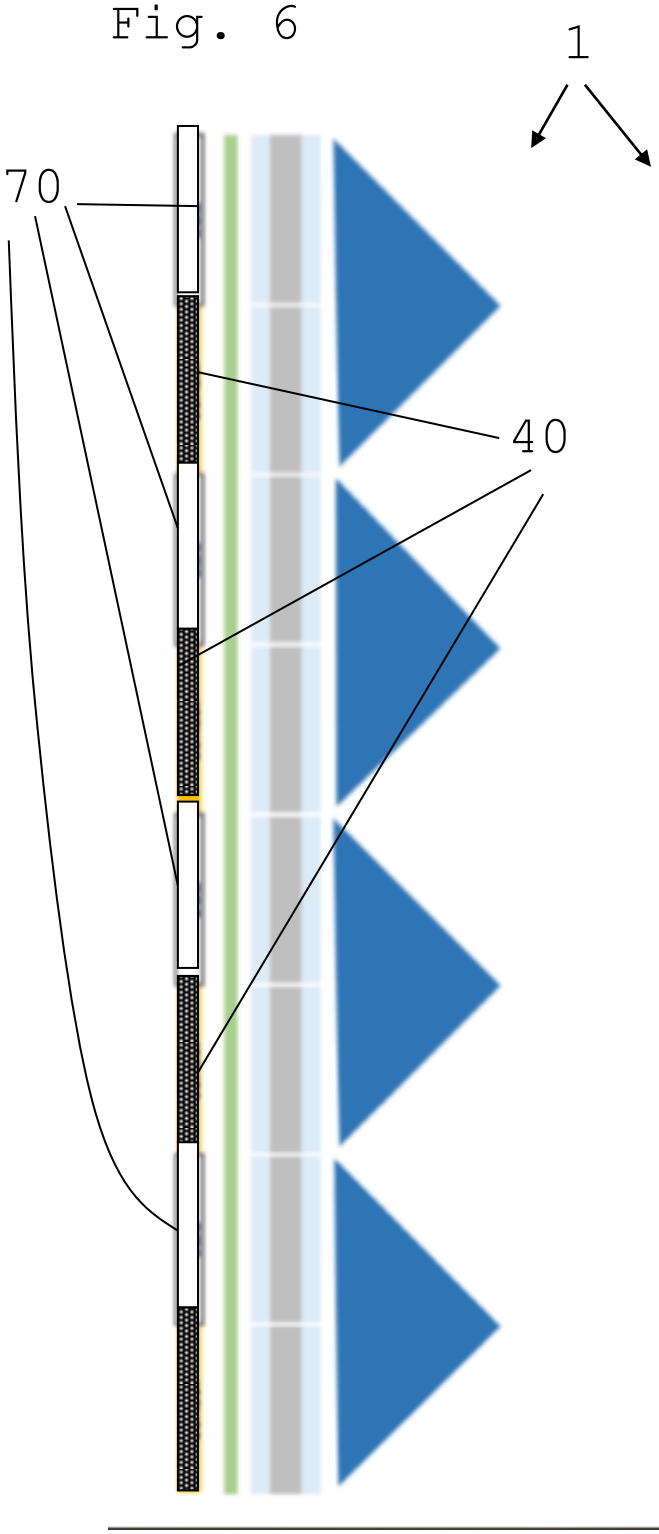


Fig. 7

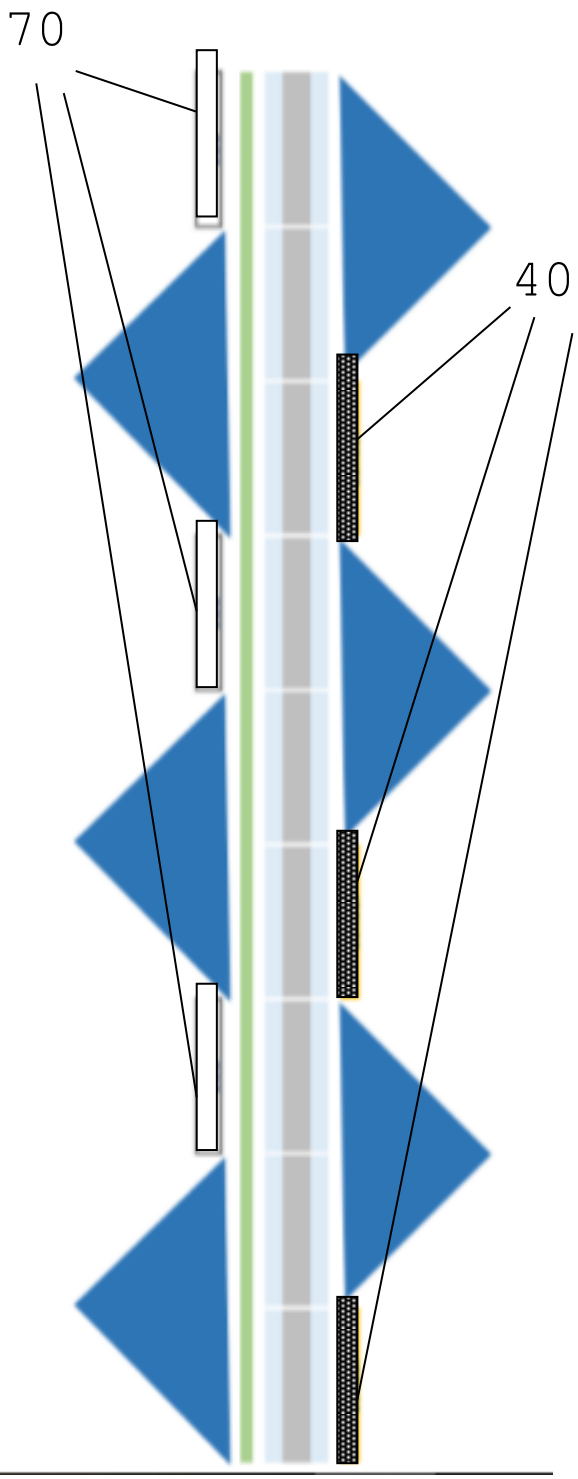


Fig. 8

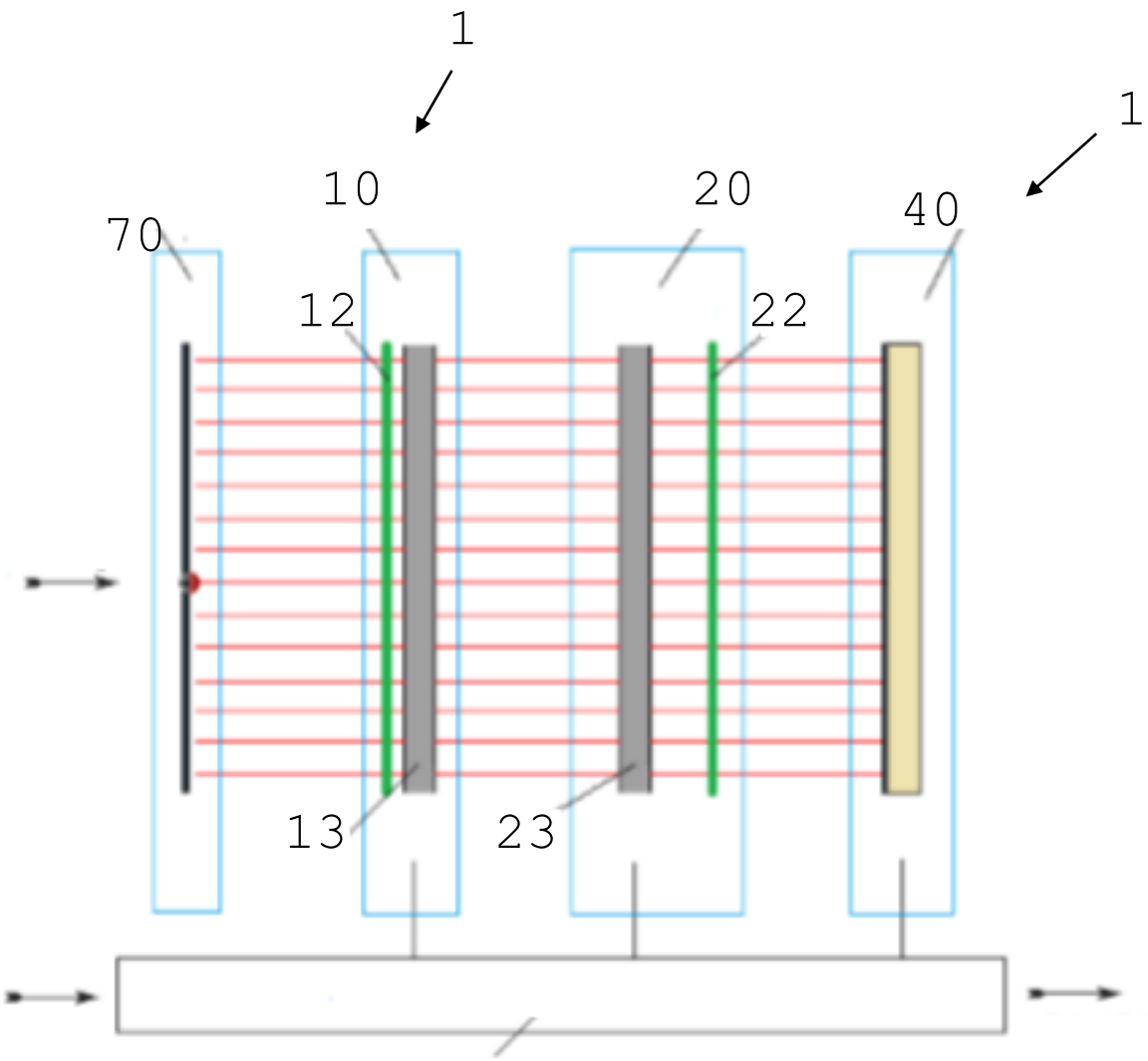


Fig. 9

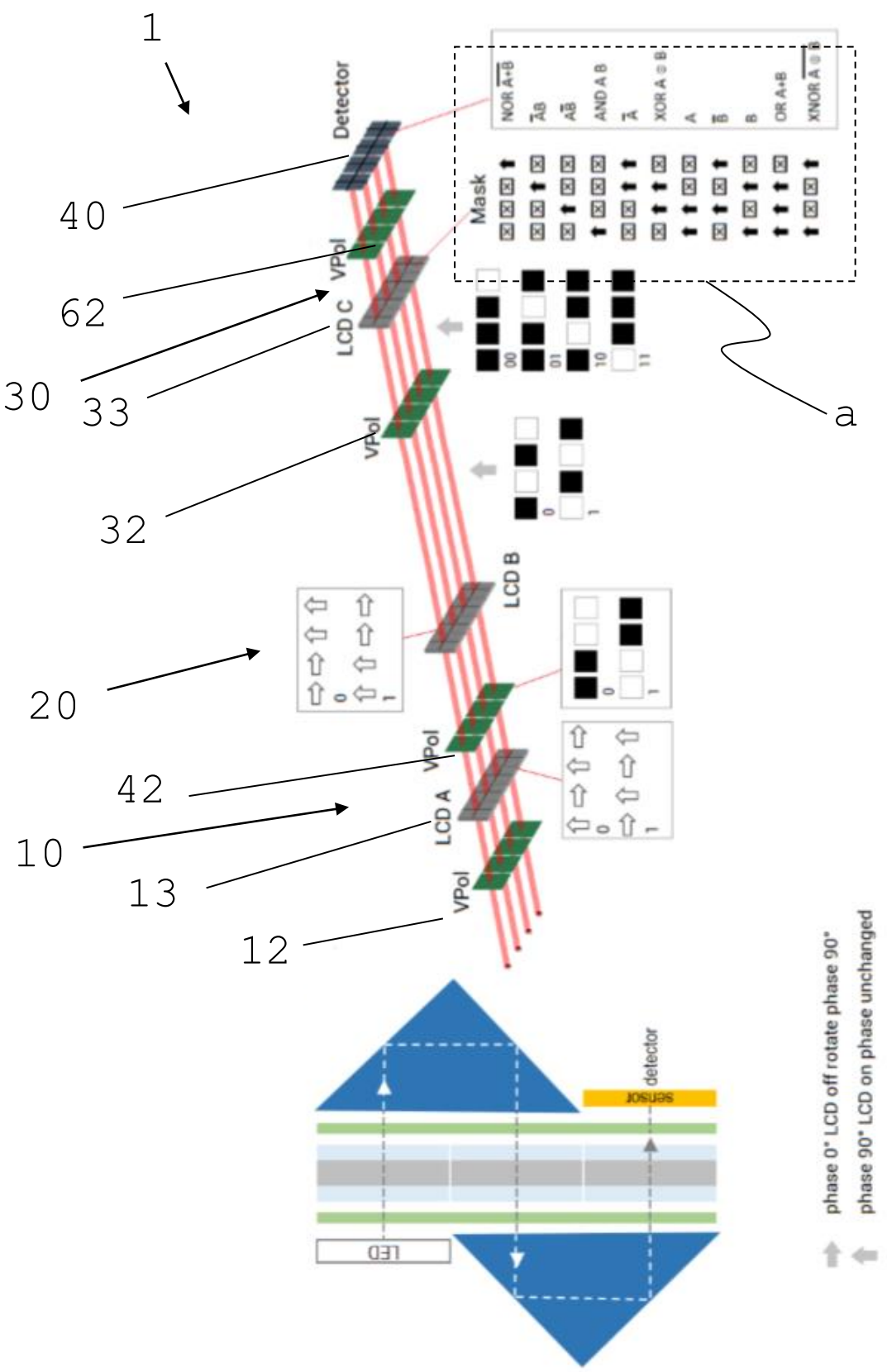

1
Detector
40
VPol
62
LCD C
30
33
VPol
32
Mask
NOR A+B
AND A B
XOR A ⊕ B
OR A+B
XNOR A ⊕ B
a
LCD B
20
VPol
42
LCD A
10
13
VPol
12
detector
sensor
LED
phase 0° LCD off rotate phase 90°
phase 90° LCD on phase unchanged

Fig. 10

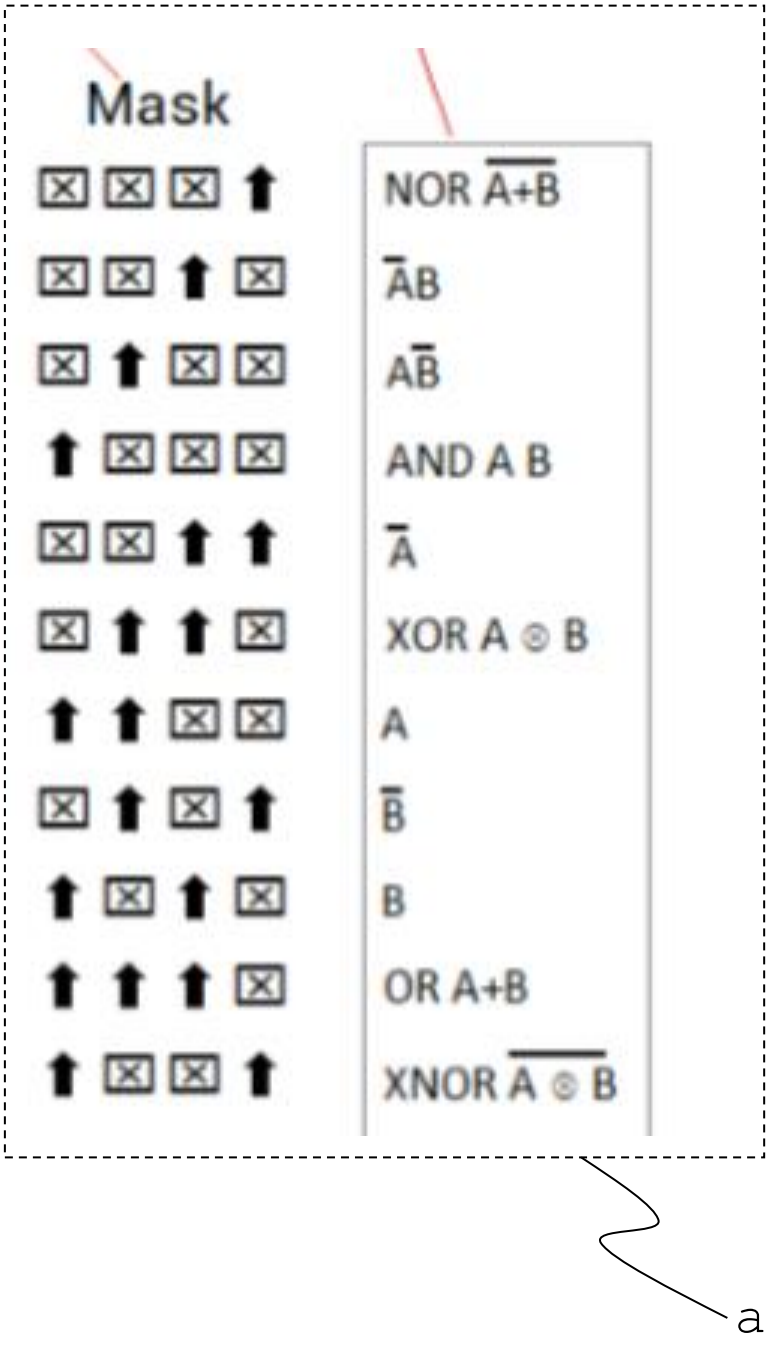
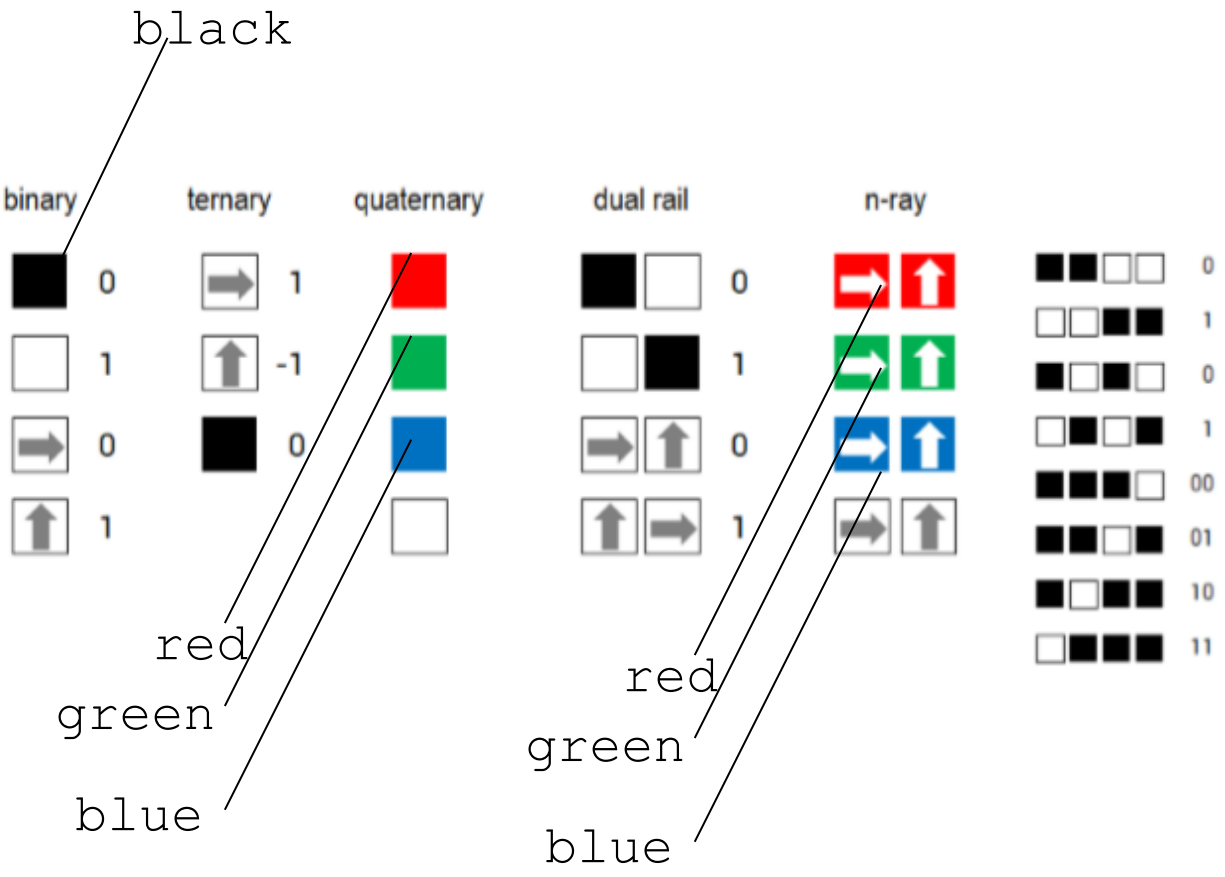

Mask
NOR $\overline{A+B}$
$\overline{A}B$
$A\overline{B}$
AND A B
$\overline{A}$
XOR A ⊙ B
A
$\overline{B}$
B
OR A+B
XNOR $\overline{A \odot B}$
a

Fig. 11


black
binary
ternary
quaternary
dual rail
n-ray
0
1
0
1
1
-1
0
0
1
0
1
red
green
blue
red
green
blue
0
1
0
1
00
01
10
11