Fig. 1

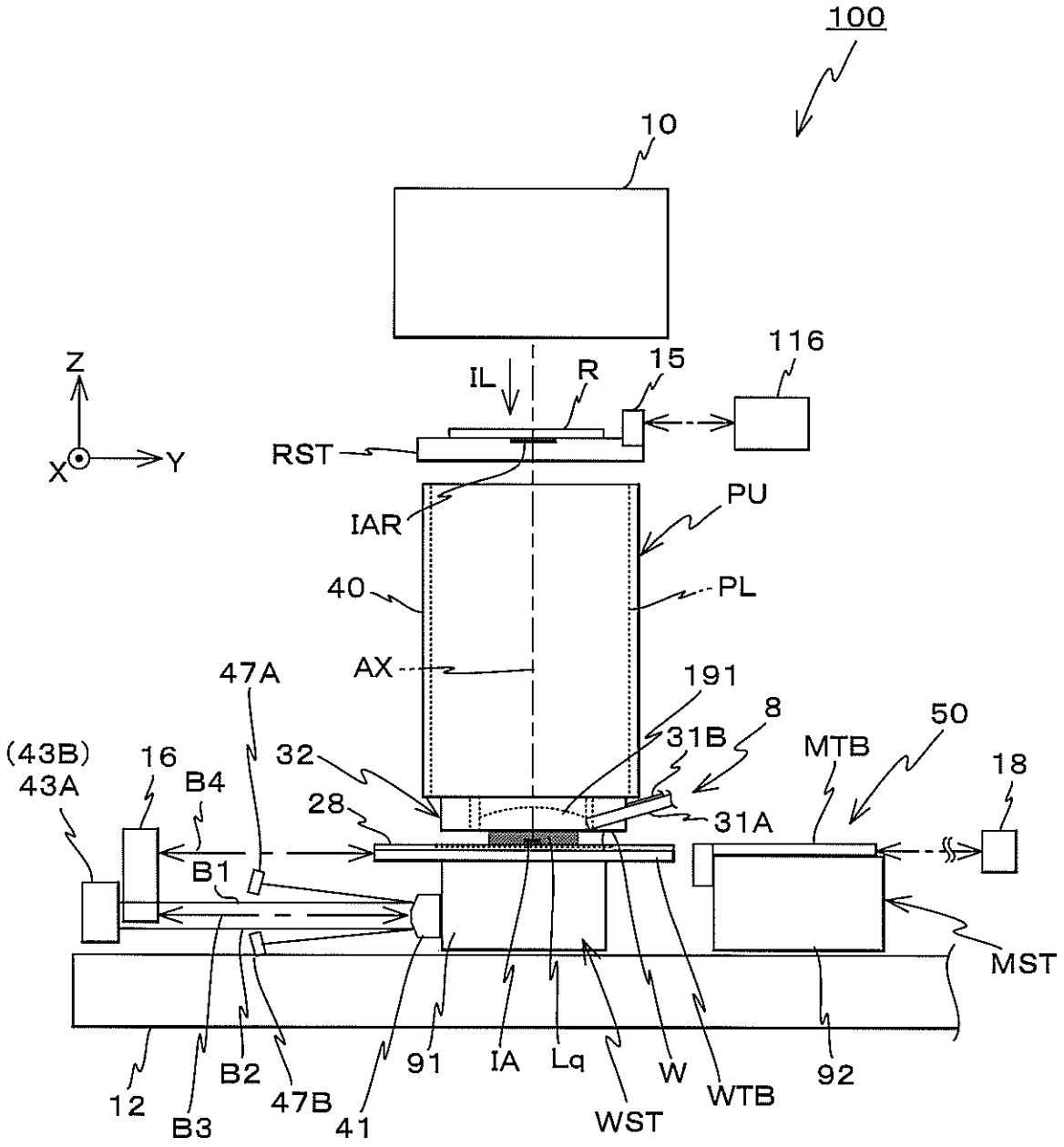

100
10
116
Z
X
Y
IL
R
15
RST
IAR
PU
PL
40
AX
47A
191
8
50
(43B)
43A
16
B4
32
31B
MTB
18
28
31A
B1
MST
12
B3
B2
47B
41
91
IA
Lq
WST
W
WTB
92

Fig. 2

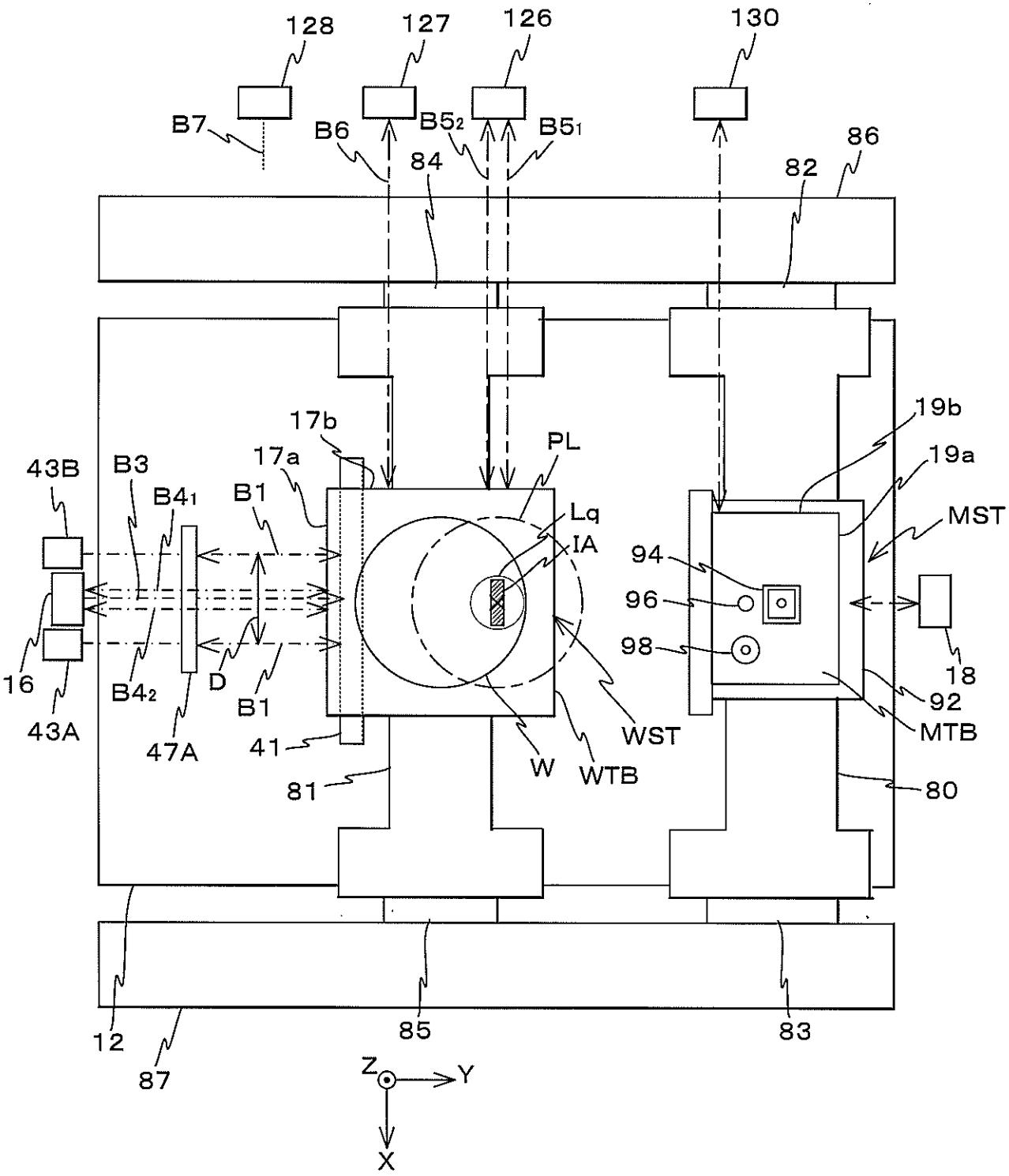

128
127
126
130
B7
B6
B5₂
B5₁
84
82
86
17b
17a
PL
19b
19a
43B
B3
B4₁
B1
Lq
IA
MST
94
96
98
16
B4₂
D
B1
18
92
43A
47A
41
W
WST
MTB
81
WTB
80
12
87
85
83
Z
Y
X

Fig. 3

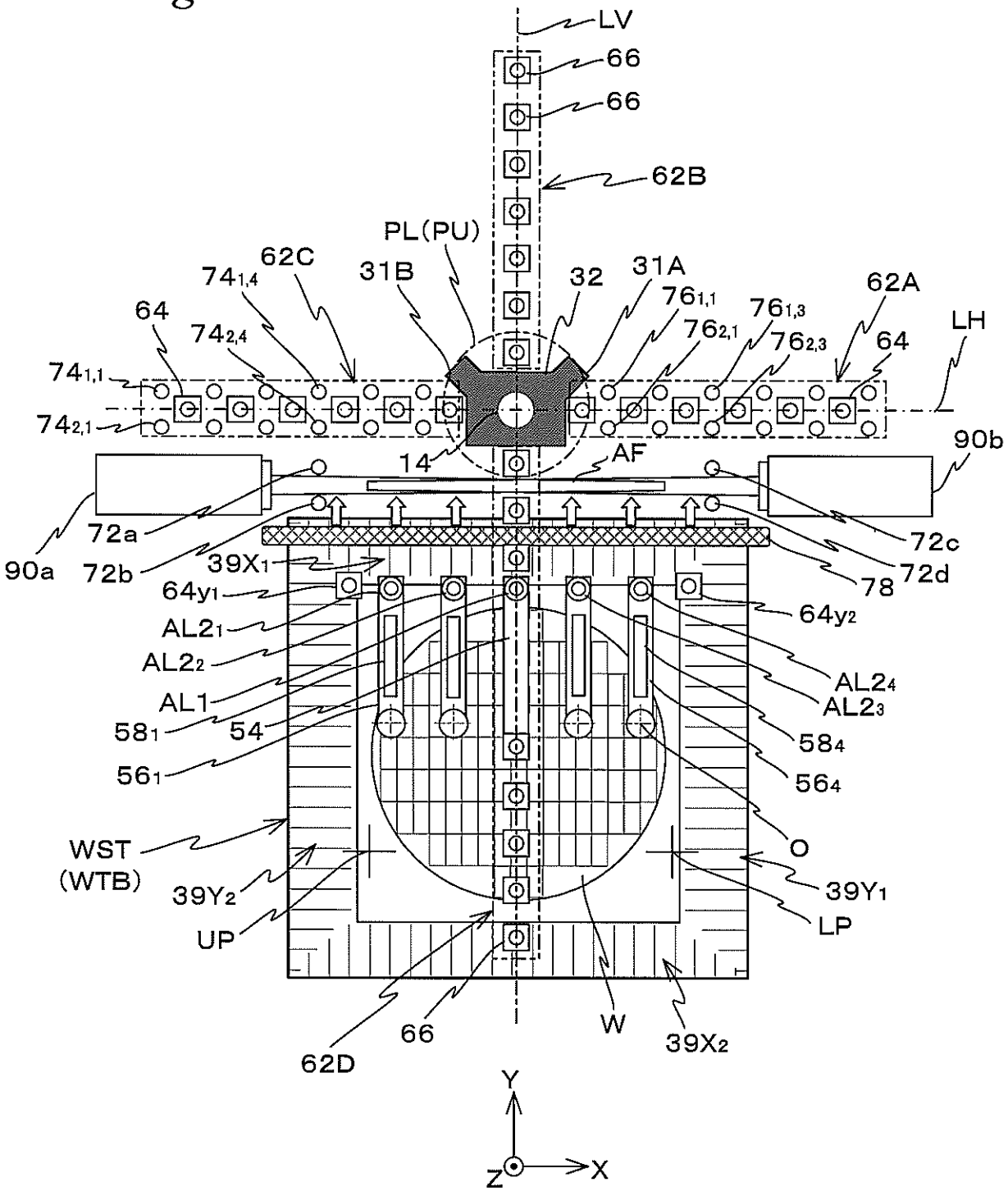

LV
66
66
62B
PL(PU)
62C
74 1,4
31B
32
31A
76 1,1
76 1,3
62A
64
74 2,4
76 2,1
76 2,3
64
LH
74 1,1
74 2,1
14
AF
90b
72a
90a
72b
39X1
64y1
AL2 1
AL2 2
AL1
58 1
54
56 1
72c
72d
78
64y2
AL2 4
AL2 3
58 4
56 4
O
WST
(WTB)
39Y2
UP
39Y1
LP
62D
66
W
39X2
Y
Z
X

Fig. 4A

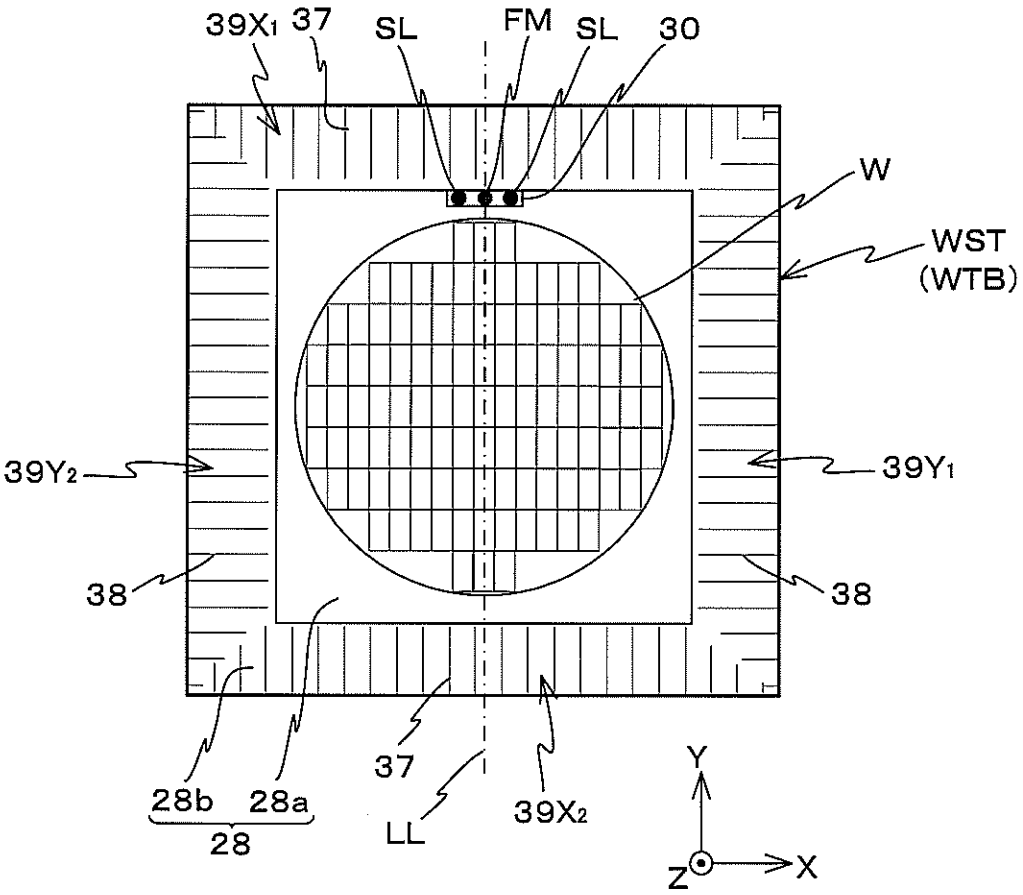

39X1
37
SL
FM
SL
30
W
WST
(WTB)
39Y2
39Y1
38
38
28b
28a
28
37
LL
39X2
Y
Z
X

Fig. 4B

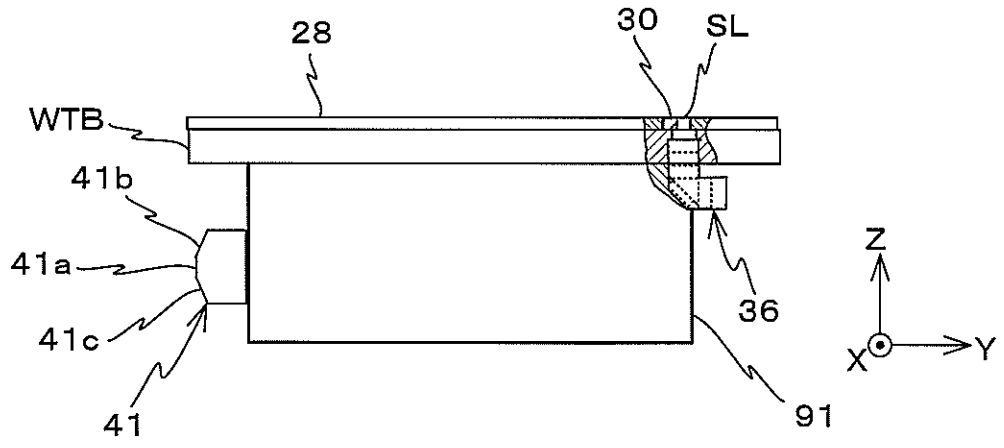

28
30
SL
WTB
41b
41a
41c
41
36
91
Z
X
Y

Fig. 5A

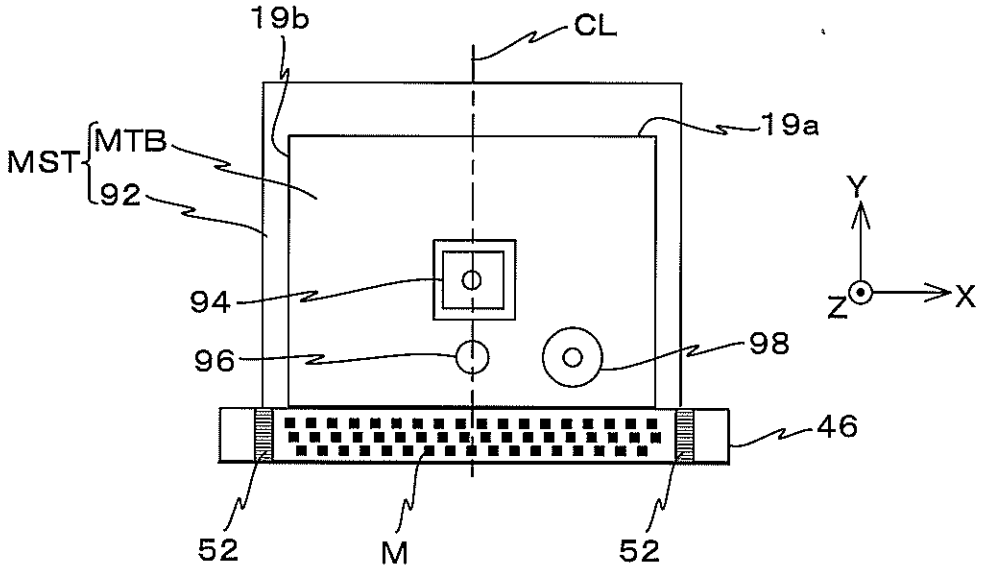


Fig. 5B

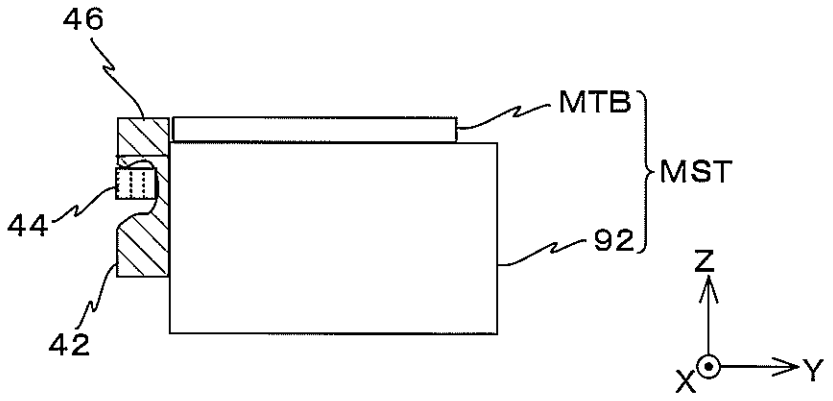


Fig. 6

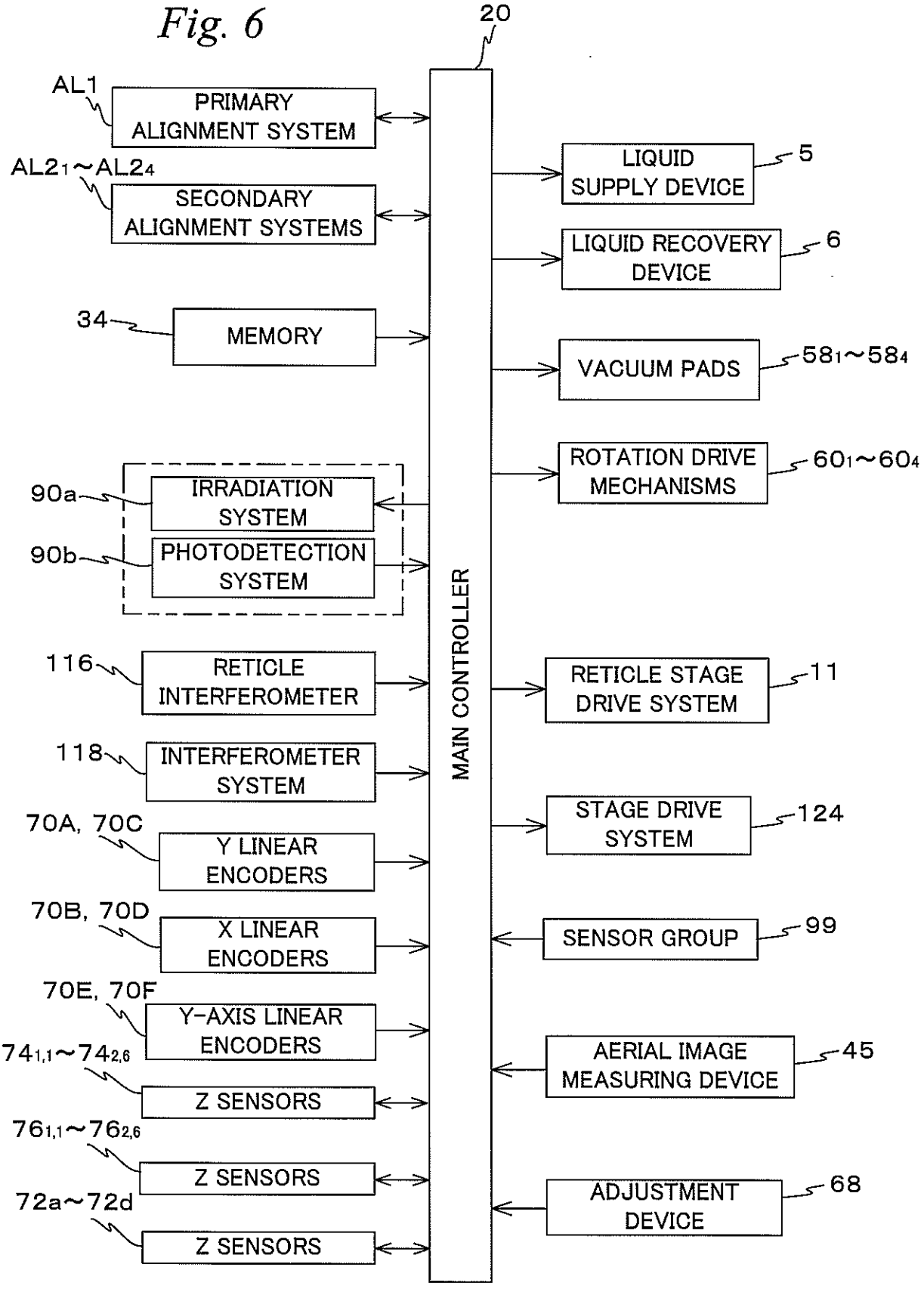

20
AL1
PRIMARY ALIGNMENT SYSTEM
AL2₁~AL2₄
SECONDARY ALIGNMENT SYSTEMS
34
MEMORY
90a
IRRADIATION SYSTEM
90b
PHOTODETECTION SYSTEM
116
RETICLE INTERFEROMETER
118
INTERFEROMETER SYSTEM
70A, 70C
Y LINEAR ENCODERS
70B, 70D
X LINEAR ENCODERS
70E, 70F
Y-AXIS LINEAR ENCODERS
74₁,₁~74₂,₆
Z SENSORS
76₁,₁~76₂,₆
Z SENSORS
72a~72d
Z SENSORS
MAIN CONTROLLER
LIQUID SUPPLY DEVICE
5
LIQUID RECOVERY DEVICE
6
VACUUM PADS
58₁~58₄
ROTATION DRIVE MECHANISMS
60₁~60₄
RETICLE STAGE DRIVE SYSTEM
11
STAGE DRIVE SYSTEM
124
SENSOR GROUP
99
AERIAL IMAGE MEASURING DEVICE
45
ADJUSTMENT DEVICE
68

Fig. 7A

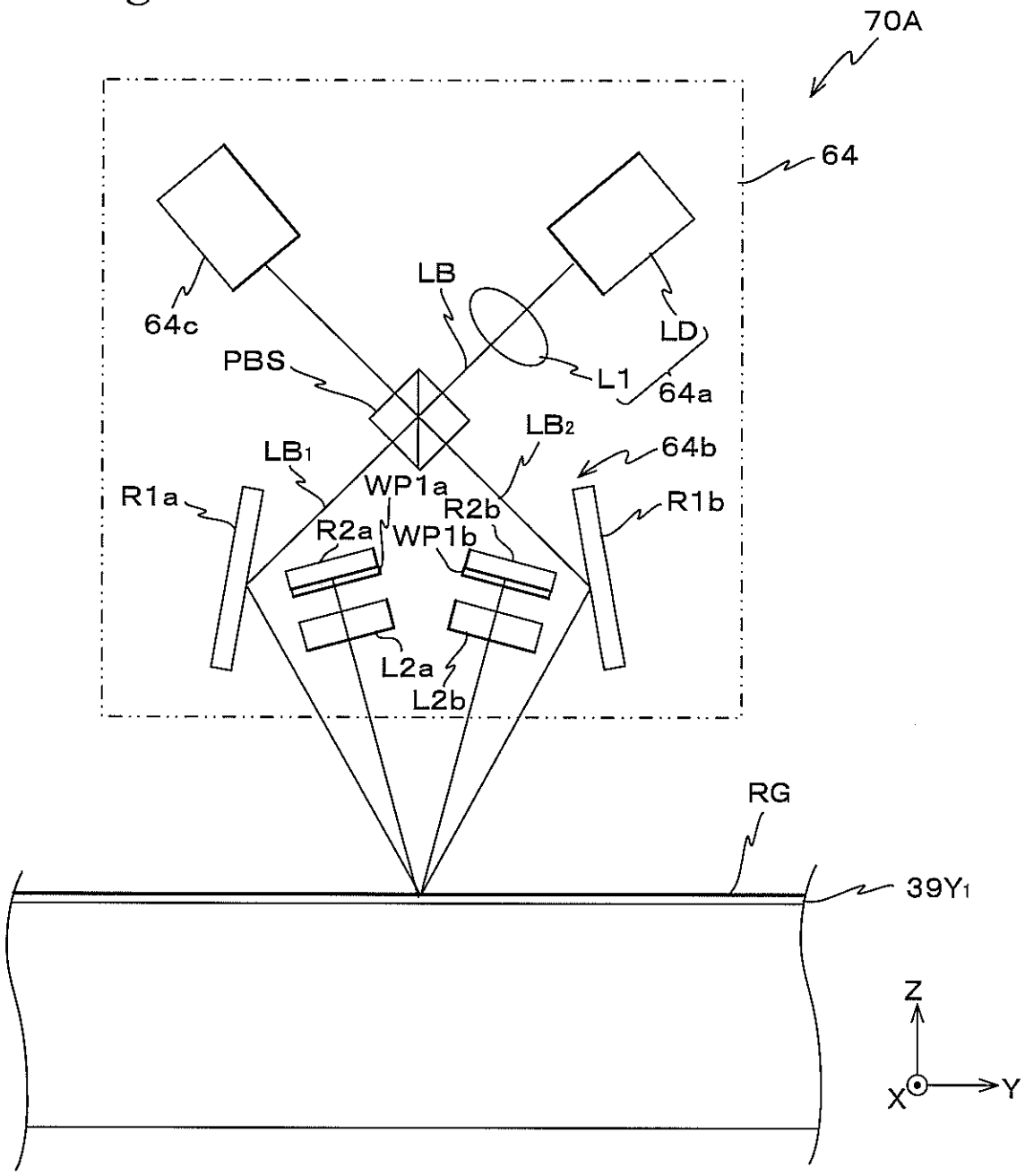

70A
64
64c
LB
LD
PBS
L1
64a
LB2
64b
LB1
WP1a
R1a
R2b
R1b
R2a
WP1b
L2a
L2b
RG
39Y1
Z
X
Y

Fig. 7B

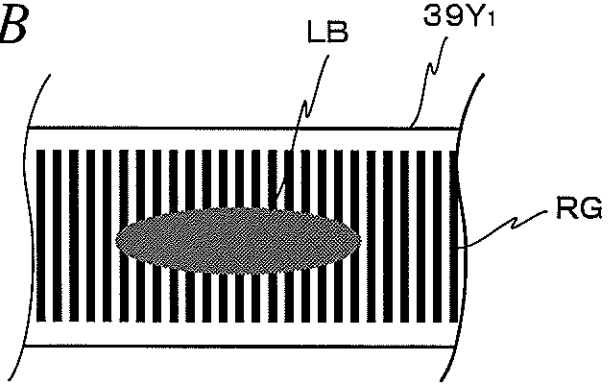

LB
39Y1
RG

Fig. 8A

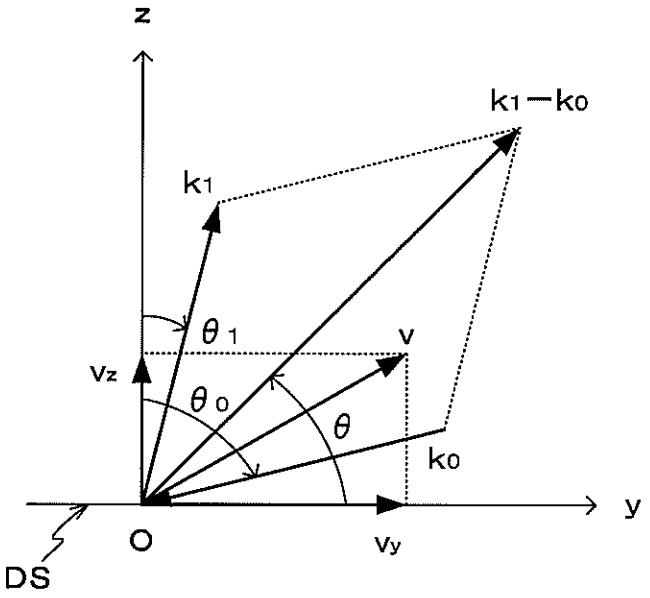

z
k1−k0
k1
θ 1
v
vz
θ 0
θ
k0
y
O
vy
DS

Fig. 8B

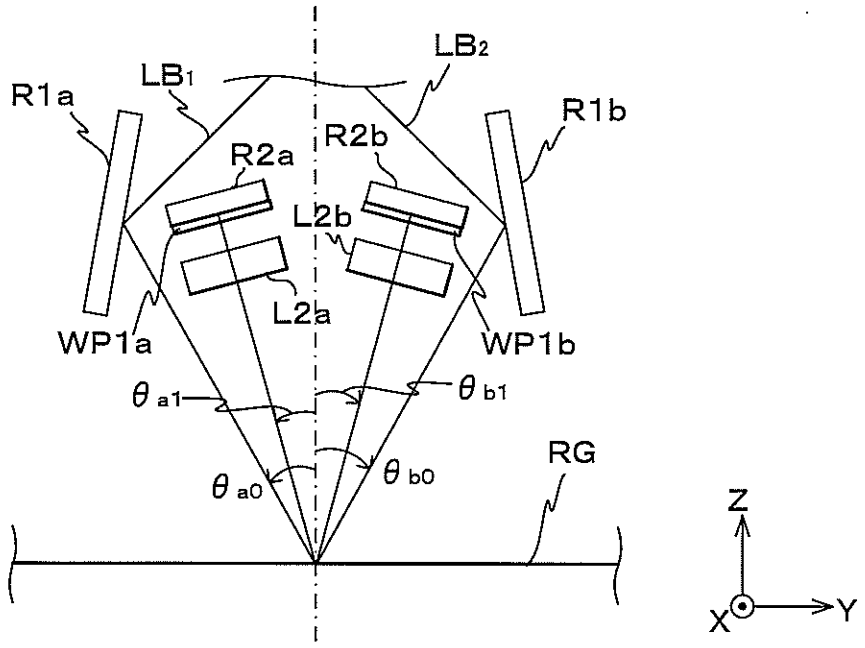

LB2
LB1
R1a
R1b
R2b
R2a
L2b
L2a
WP1a
WP1b
θ a1
θ b1
RG
θ a0
θ b0
Z
X
Y

Fig. 9A

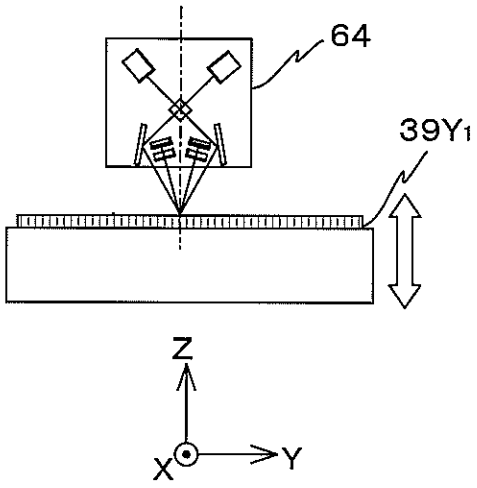


Fig. 9B

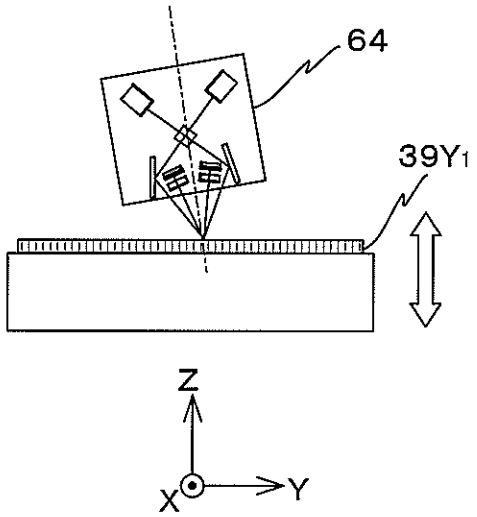


Fig. 10A

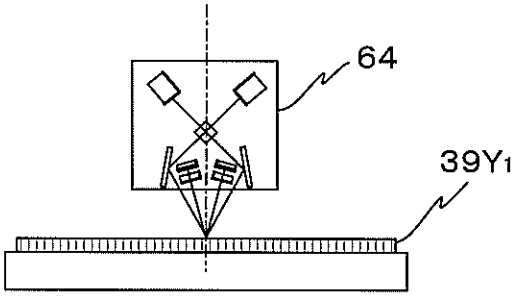


Fig. 10B

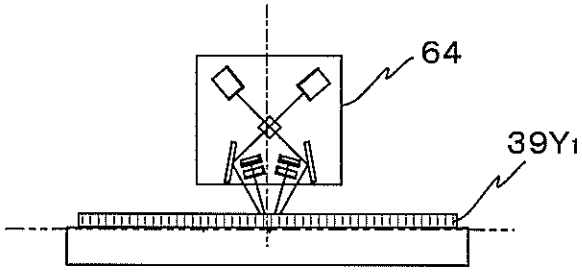


Fig. 10C

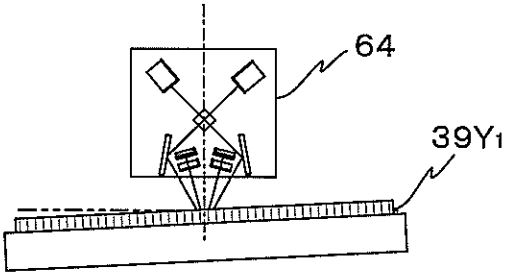


Fig. 10D

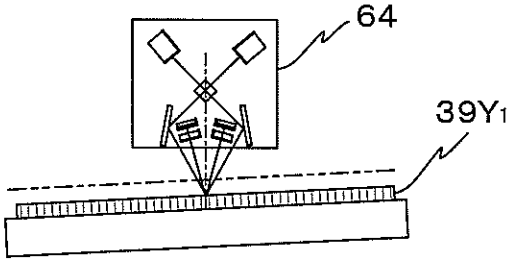


Fig. 11A

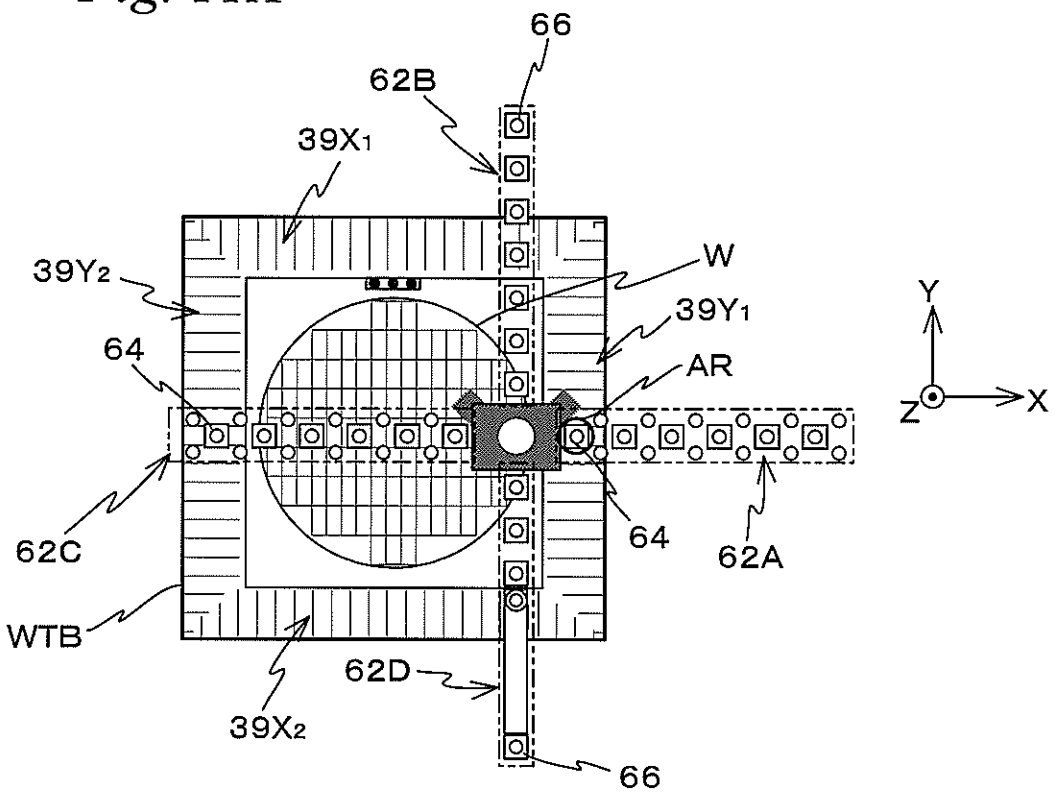


Fig. 11B

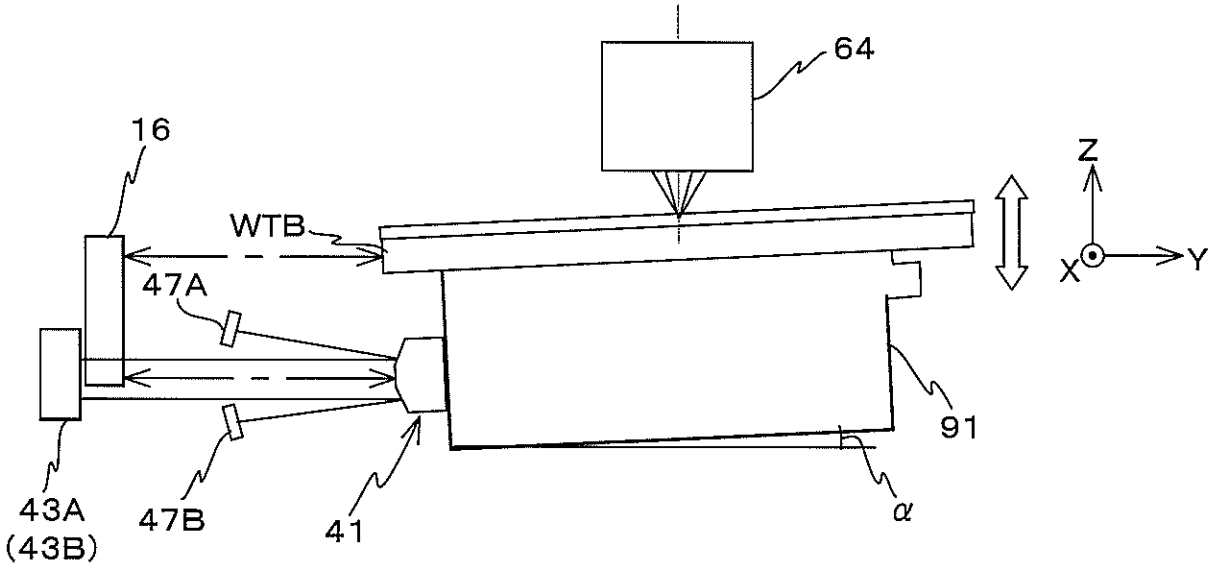


Fig. 12

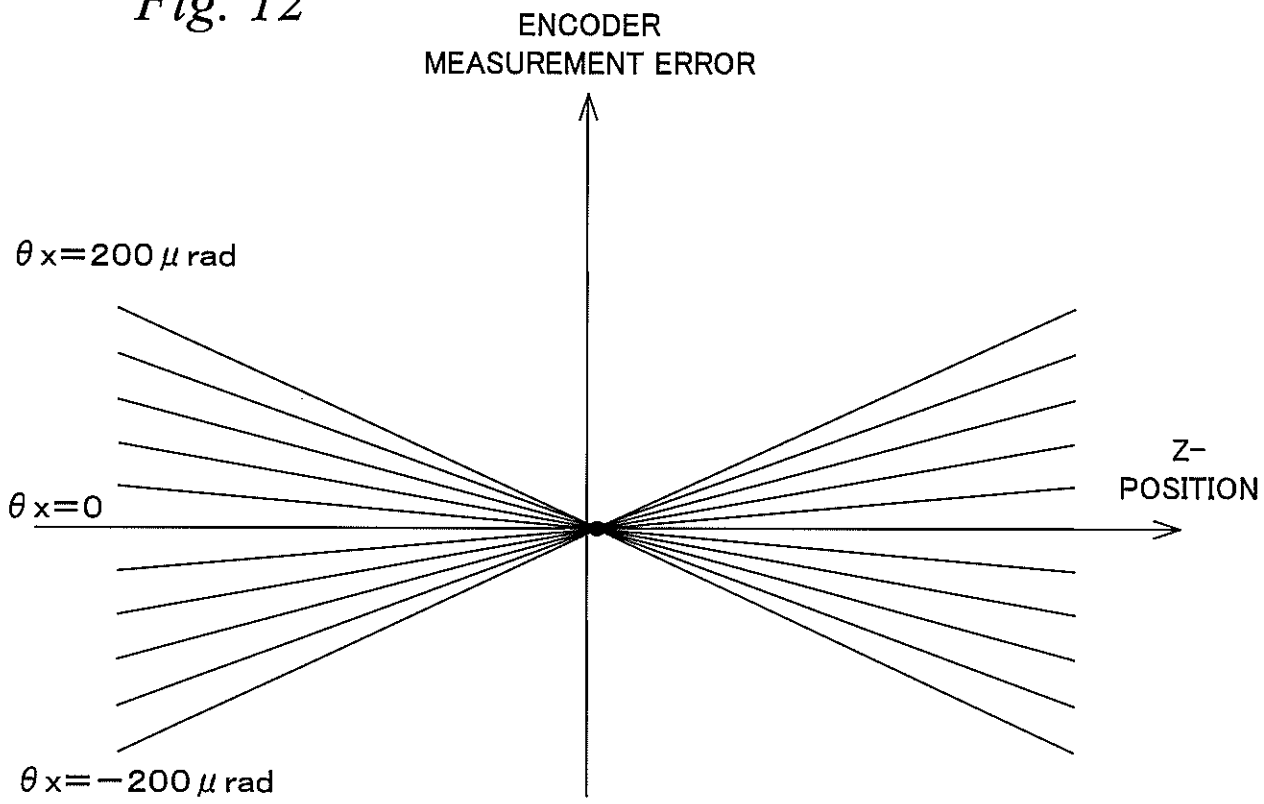

ENCODER
MEASUREMENT ERROR
θx=200μrad
θx=0
θx=−200μrad
Z-
POSITION

Fig. 13

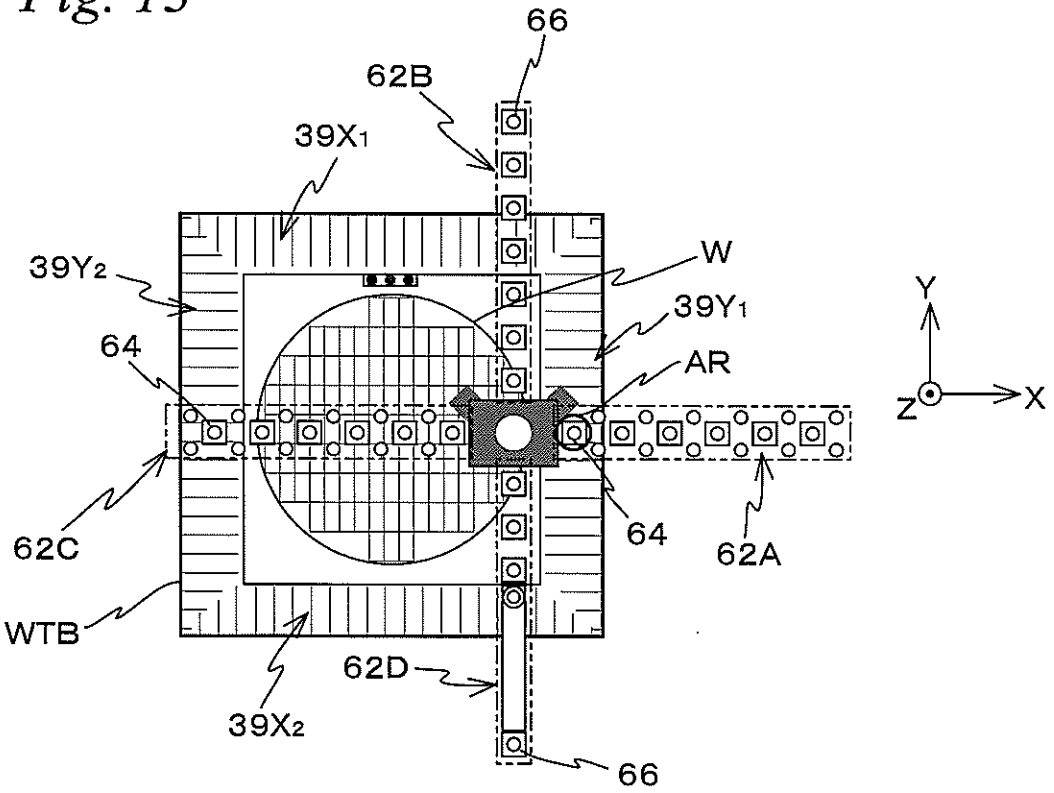

66
62B
39X1
39Y2
W
39Y1
64
AR
Y
Z
X
62C
64
62A
WTB
62D
39X2
66

Fig. 14

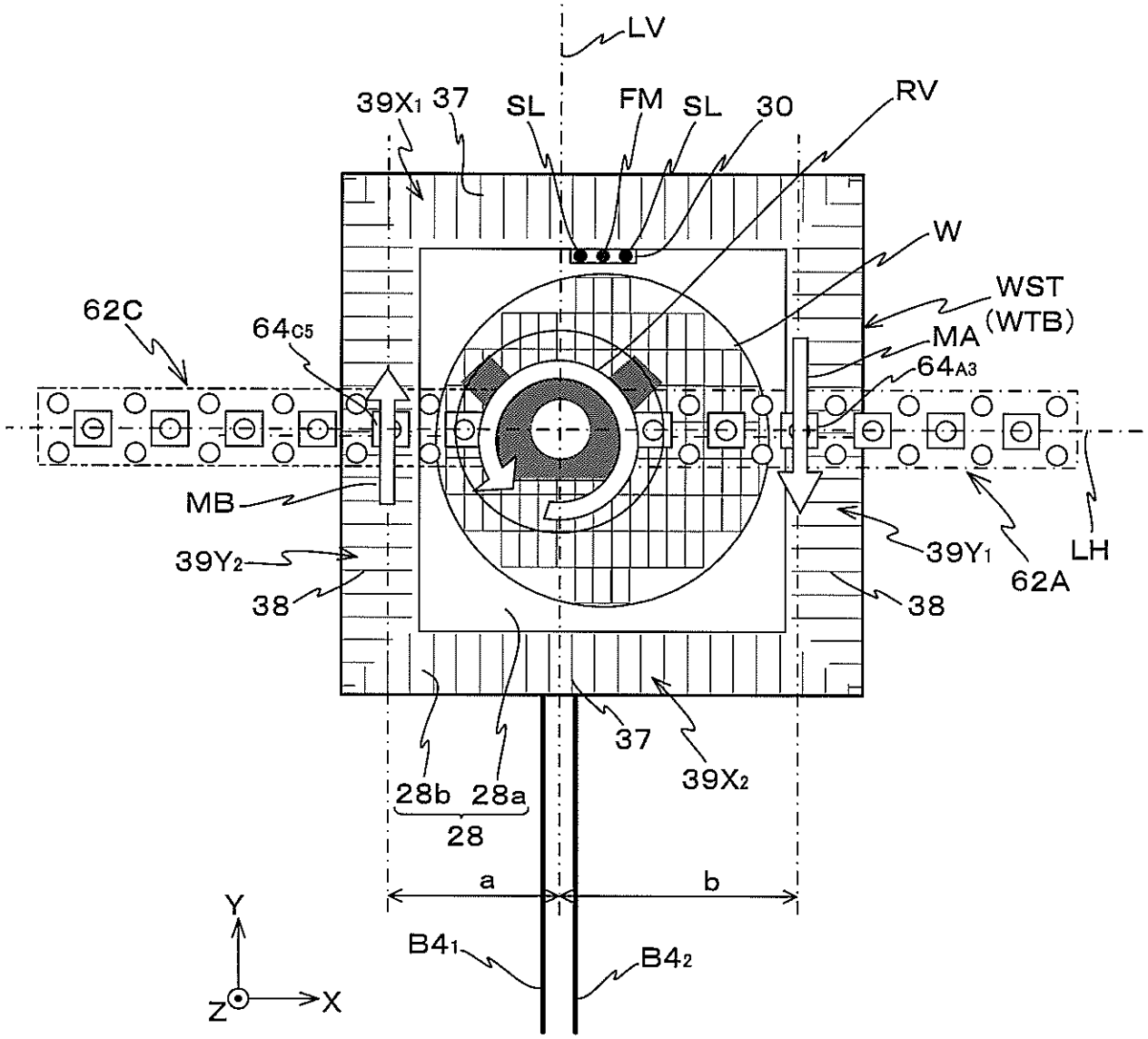

LV
39X1
37
SL
FM
SL
30
RV
W
WST
(WTB)
MA
64A3
62C
64C5
MB
39Y2
38
39Y1
LH
62A
38
37
39X2
28b
28a
28
a
b
Y
Z
X
B41
B42

Fig. 15

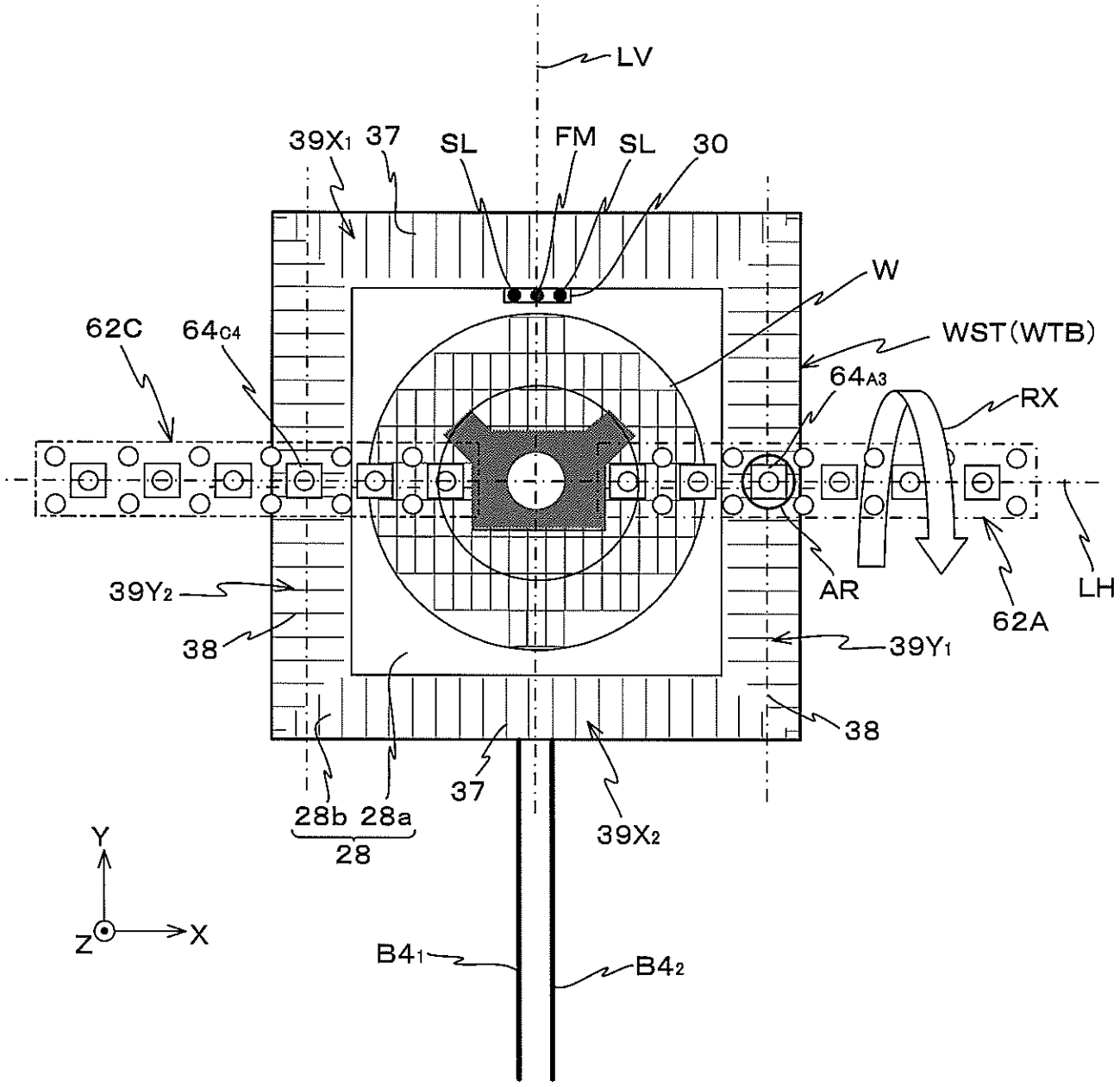

LV
39X1
37
SL
FM
SL
30
W
62C
64C4
WST(WTB)
64A3
RX
39Y2
38
AR
62A
LH
39Y1
38
37
28b
28a
28
39X2
Y
Z
X
B41
B42

Fig. 16

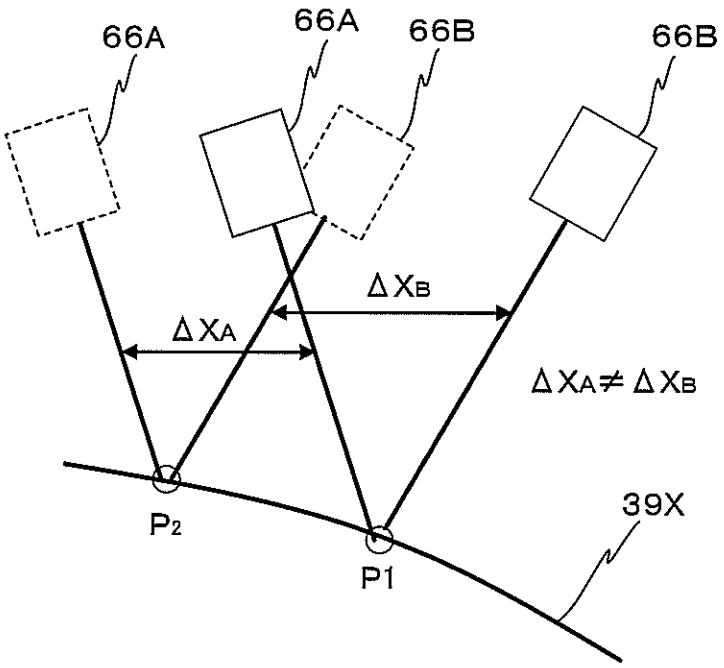

66A
66A
66B
66B
ΔXB
ΔXA
ΔXA≠ΔXB
P2
P1
39X

Fig. 17

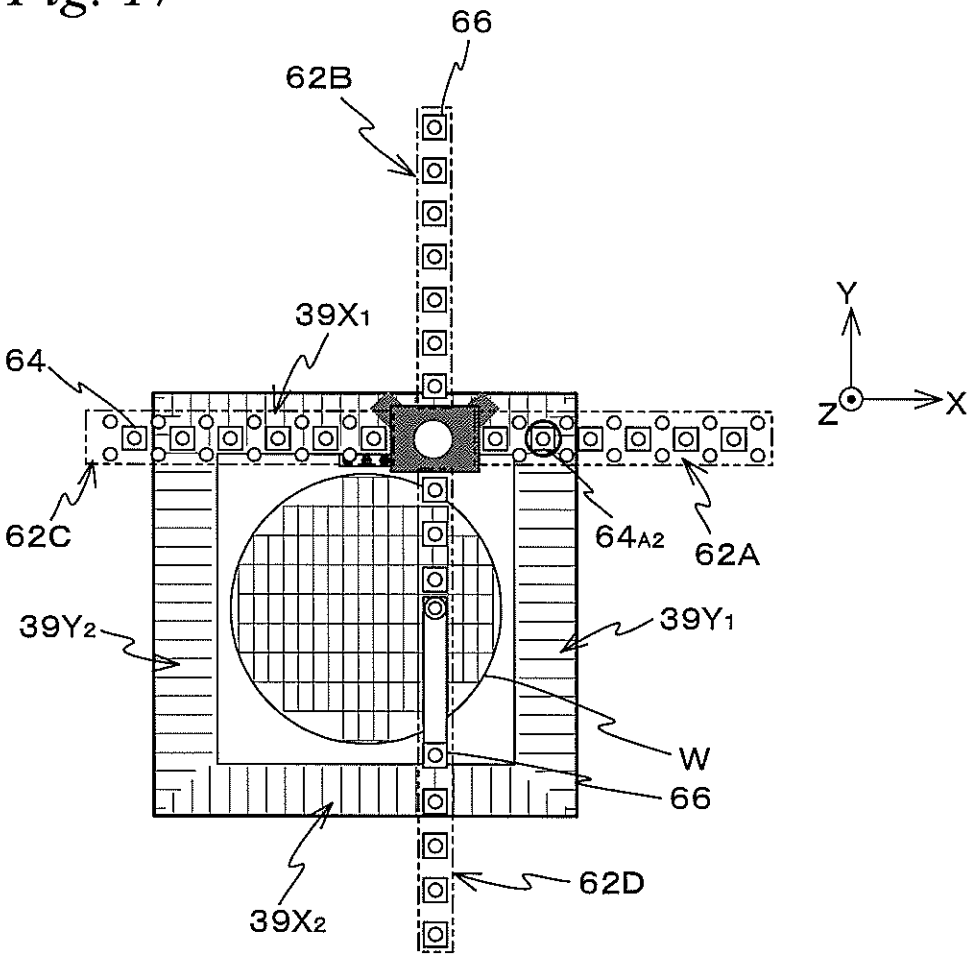

66
62B
39X1
64
62C
64A2
62A
Y
Z
X
39Y2
39Y1
W
66
62D
39X2

Fig. 18A

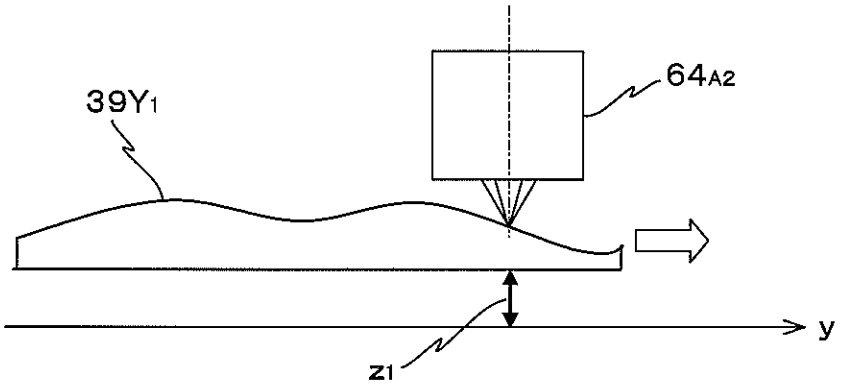


Fig. 18B

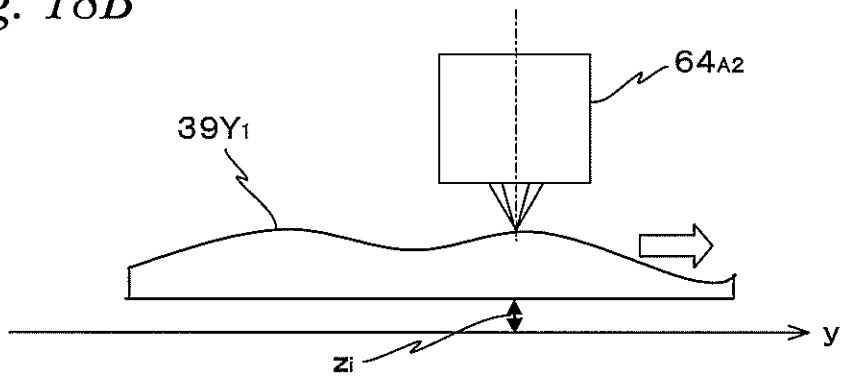


Fig. 18C

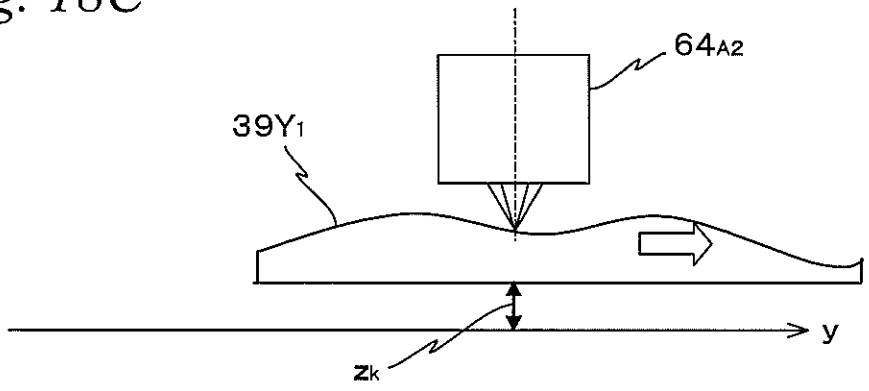


Fig. 18D

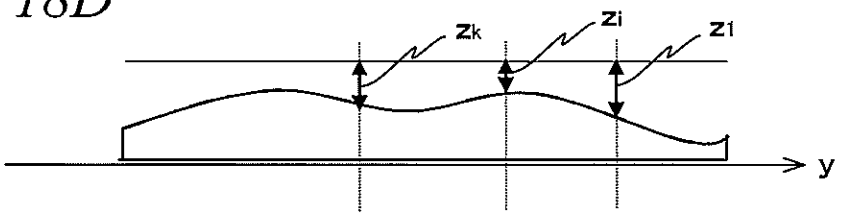


Fig. 19

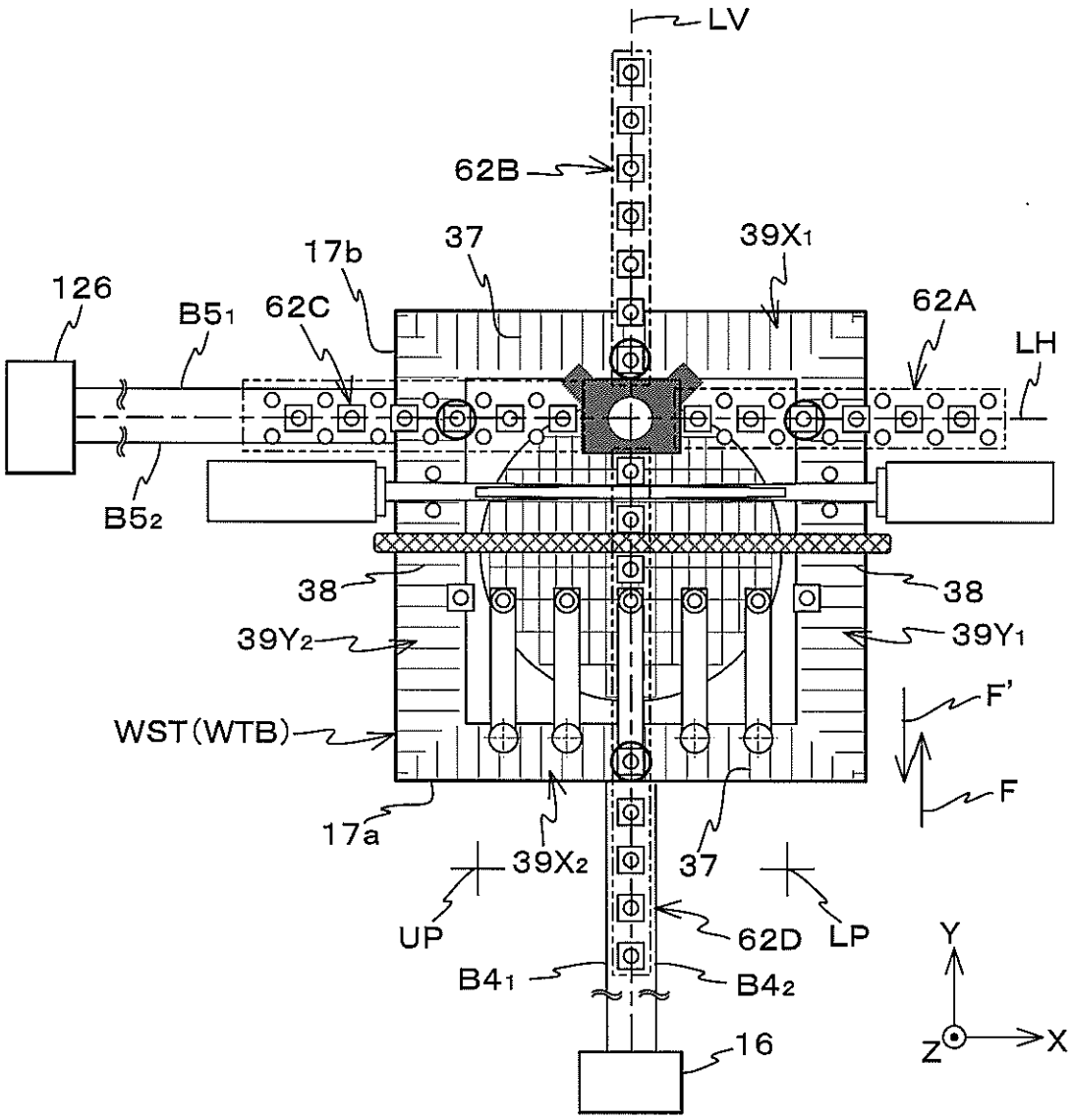

LV
62B
37
39X1
17b
126
B51
62C
62A
LH
B52
38
38
39Y2
39Y1
F'
WST(WTB)
F
17a
39X2
37
UP
LP
62D
B41
B42
16
Y
Z
X

Fig. 20

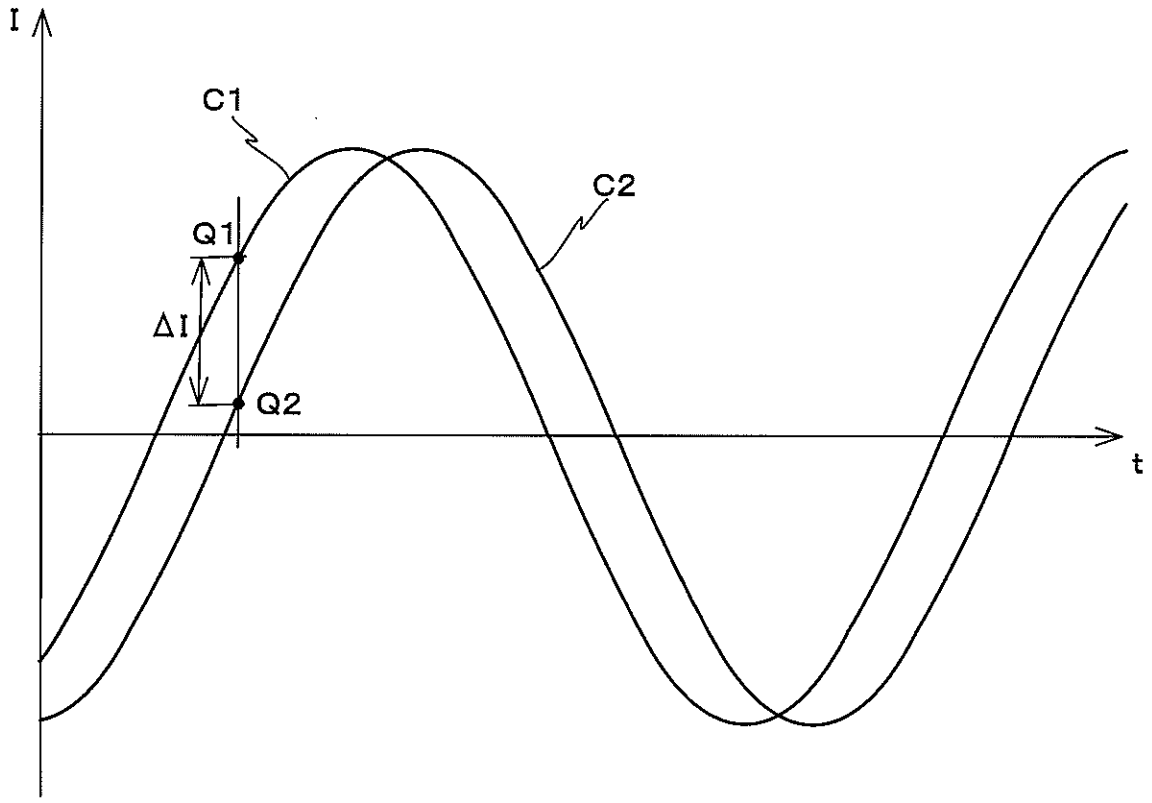


Fig. 21

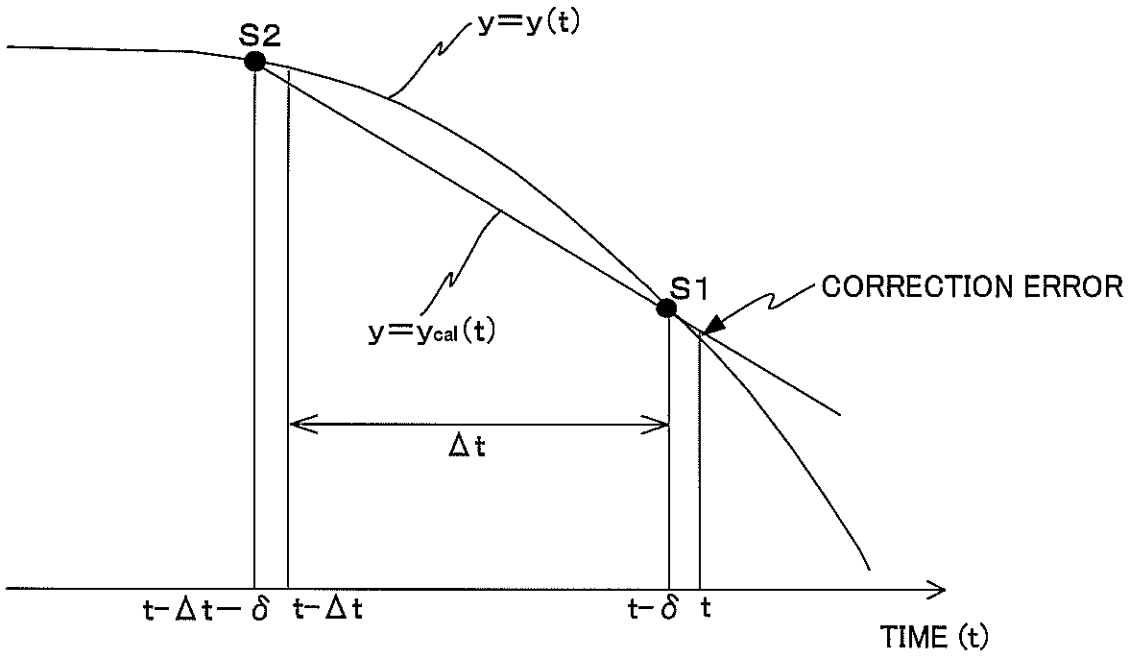


Fig. 22A

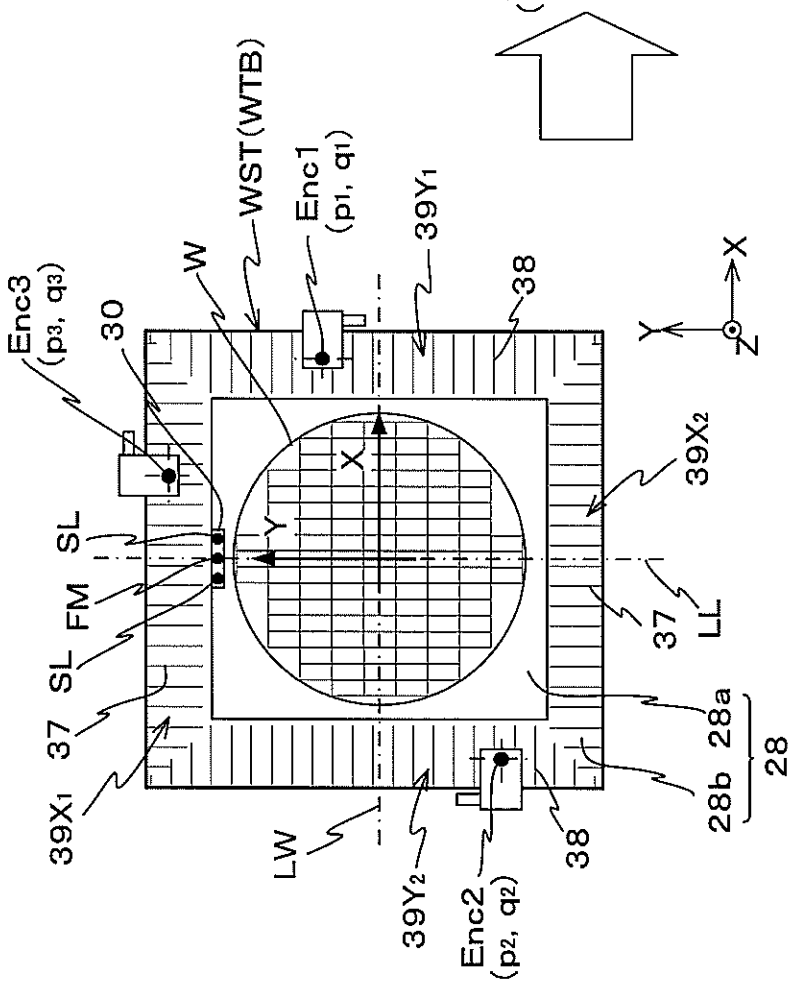


Fig. 22B

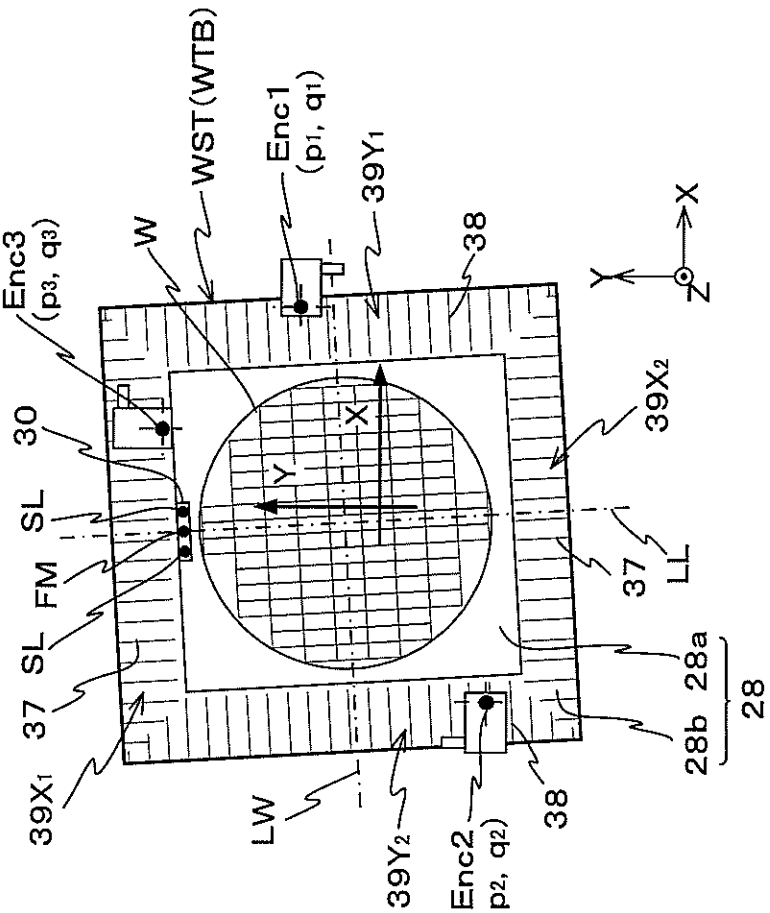


Fig. 23A

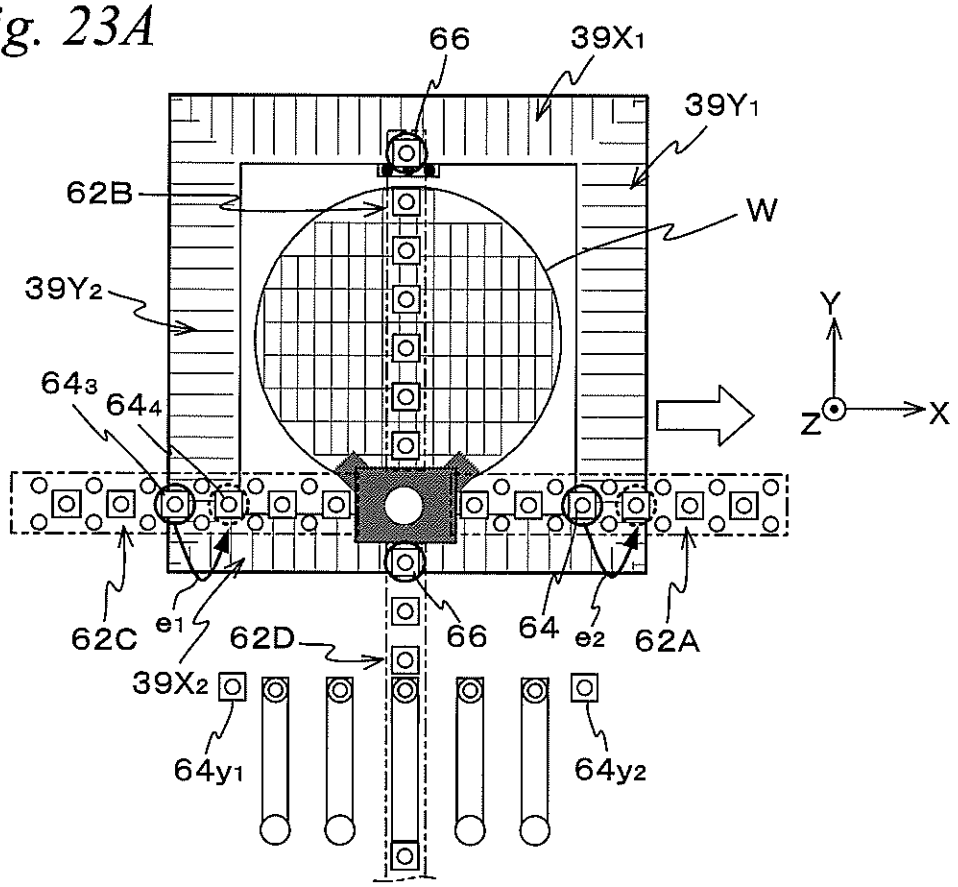


Fig. 23B

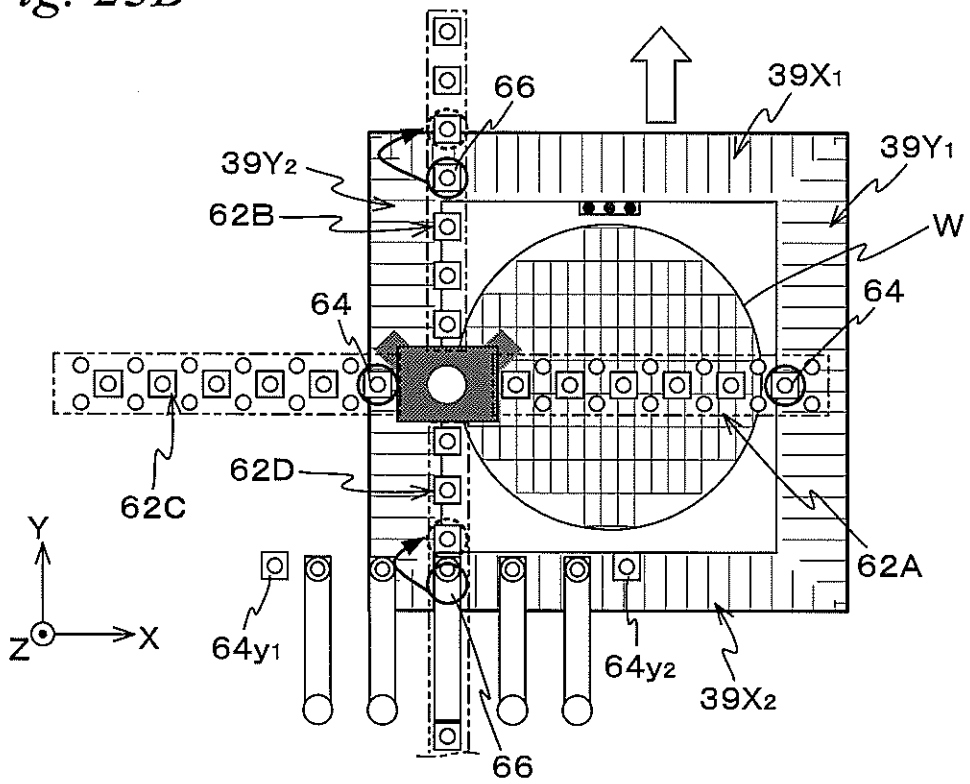


Fig. 24A

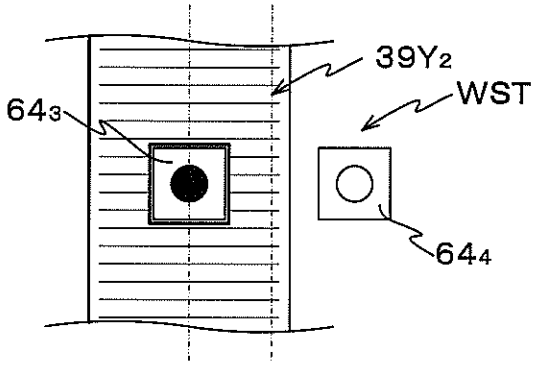


Fig. 24B

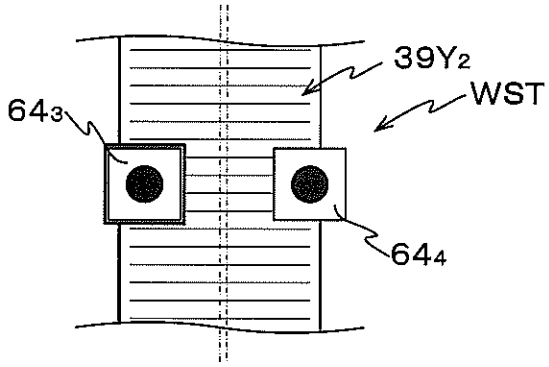


Fig. 24C

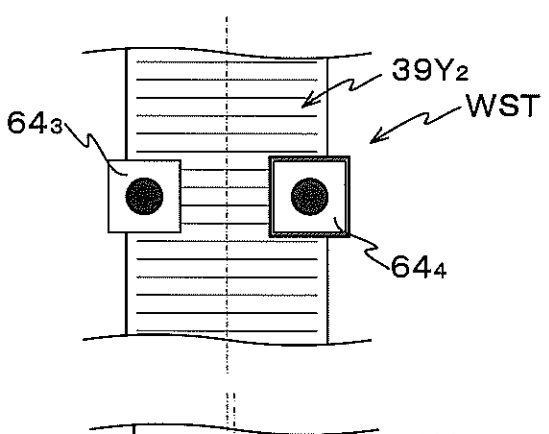


Fig. 24D

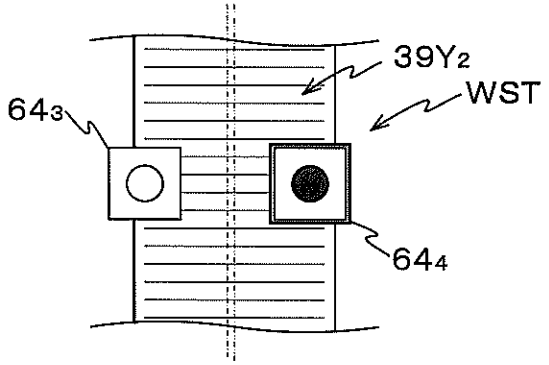


Fig. 24E

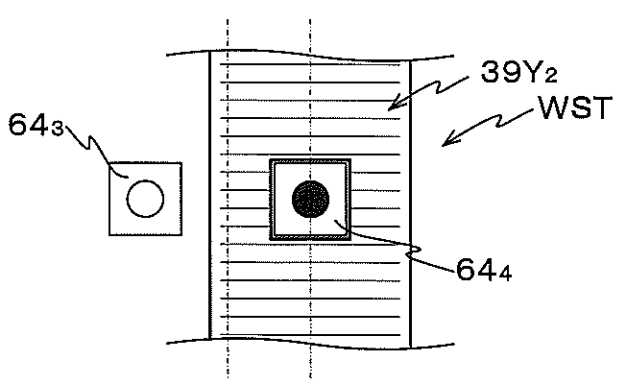


Fig. 25

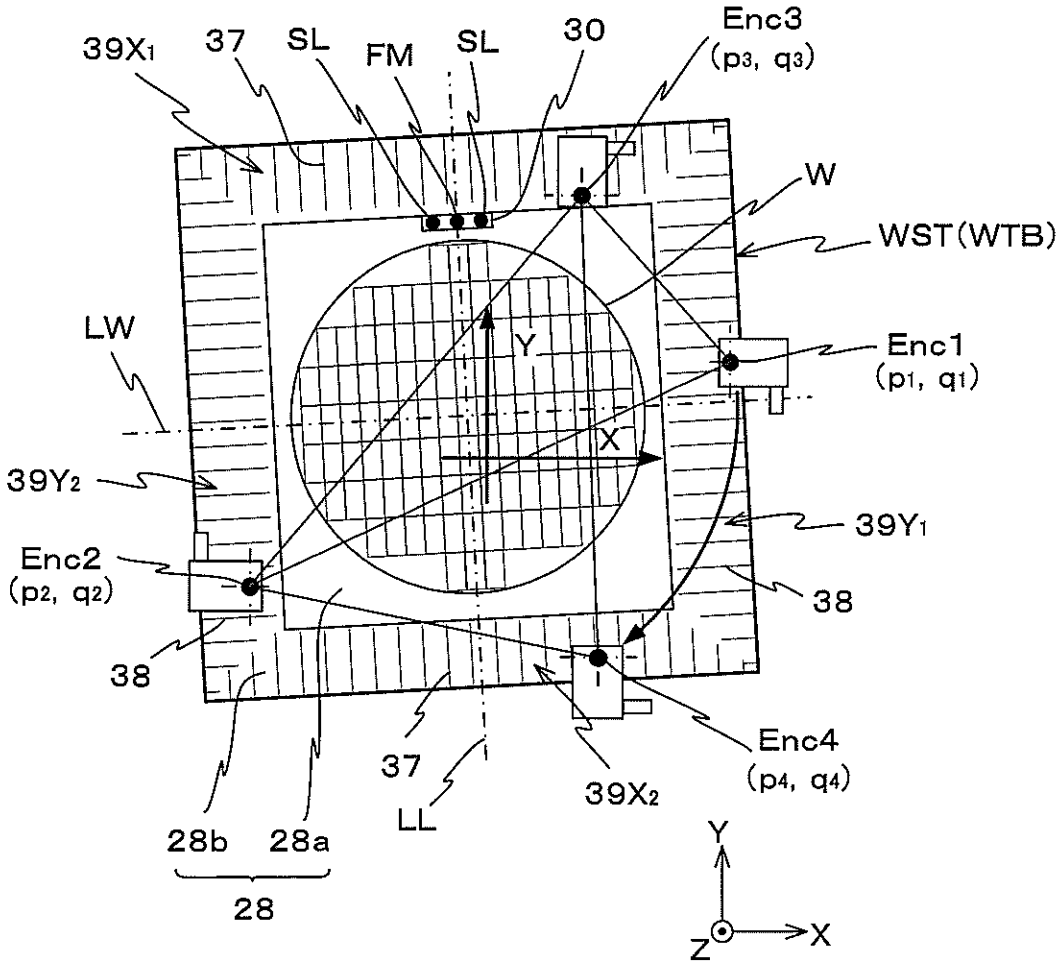

39X1
37
SL
FM
SL
30
Enc3
(p3, q3)
W
WST(WTB)
LW
Y
Enc1
(p1, q1)
X
39Y2
39Y1
Enc2
(p2, q2)
38
38
37
Enc4
(p4, q4)
LL
39X2
28b
28a
28
Y
Z
X

Fig. 26

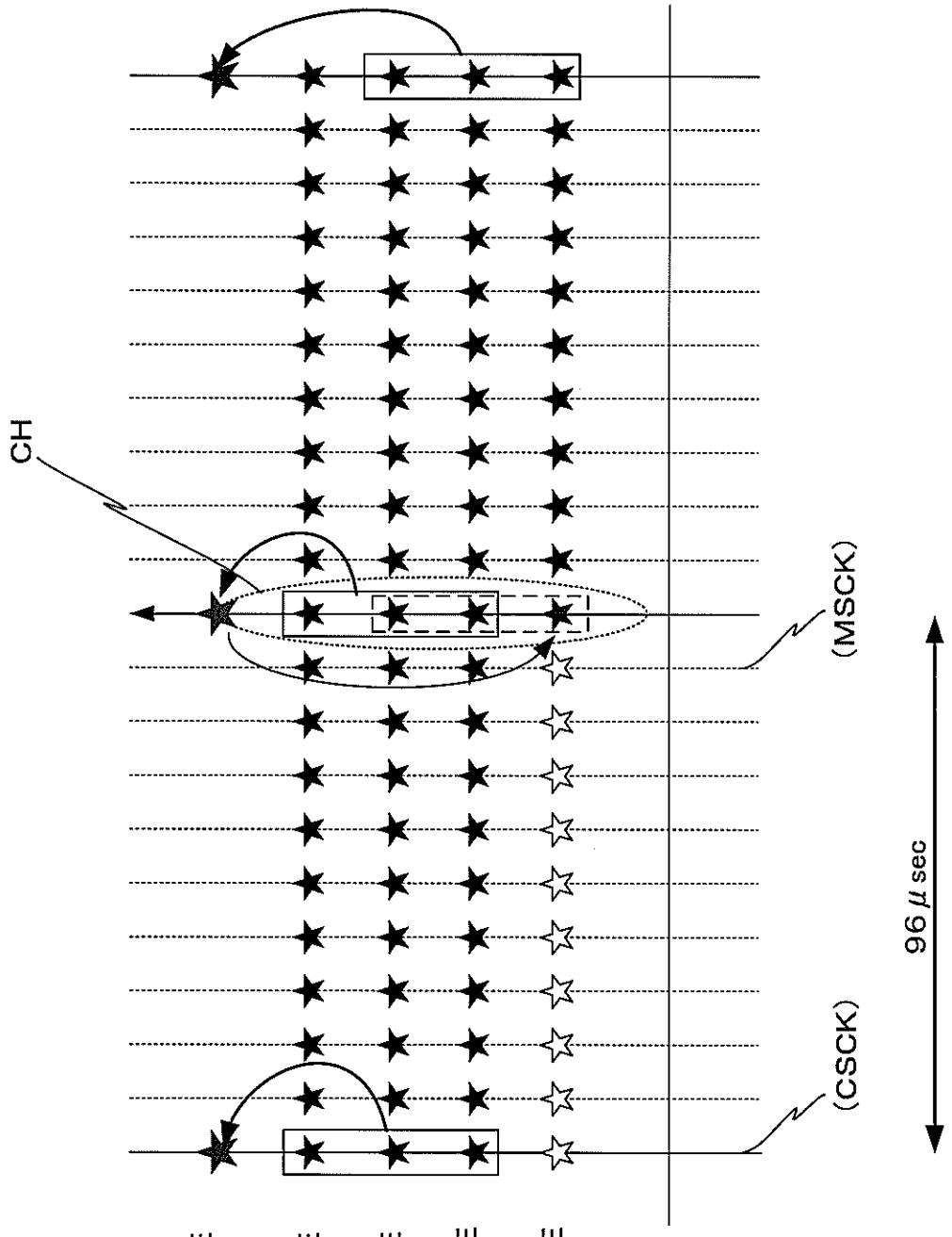

CH
(MSCK)
(CSCK)
96 μ sec
WST COORDINATE
(X, Y, θz)
Enc1 MEASUREMENT VALUE
Enc2 MEASUREMENT VALUE
Enc3 MEASUREMENT VALUE
Enc4 MEASUREMENT VALUE
CLOCK

Fig. 27

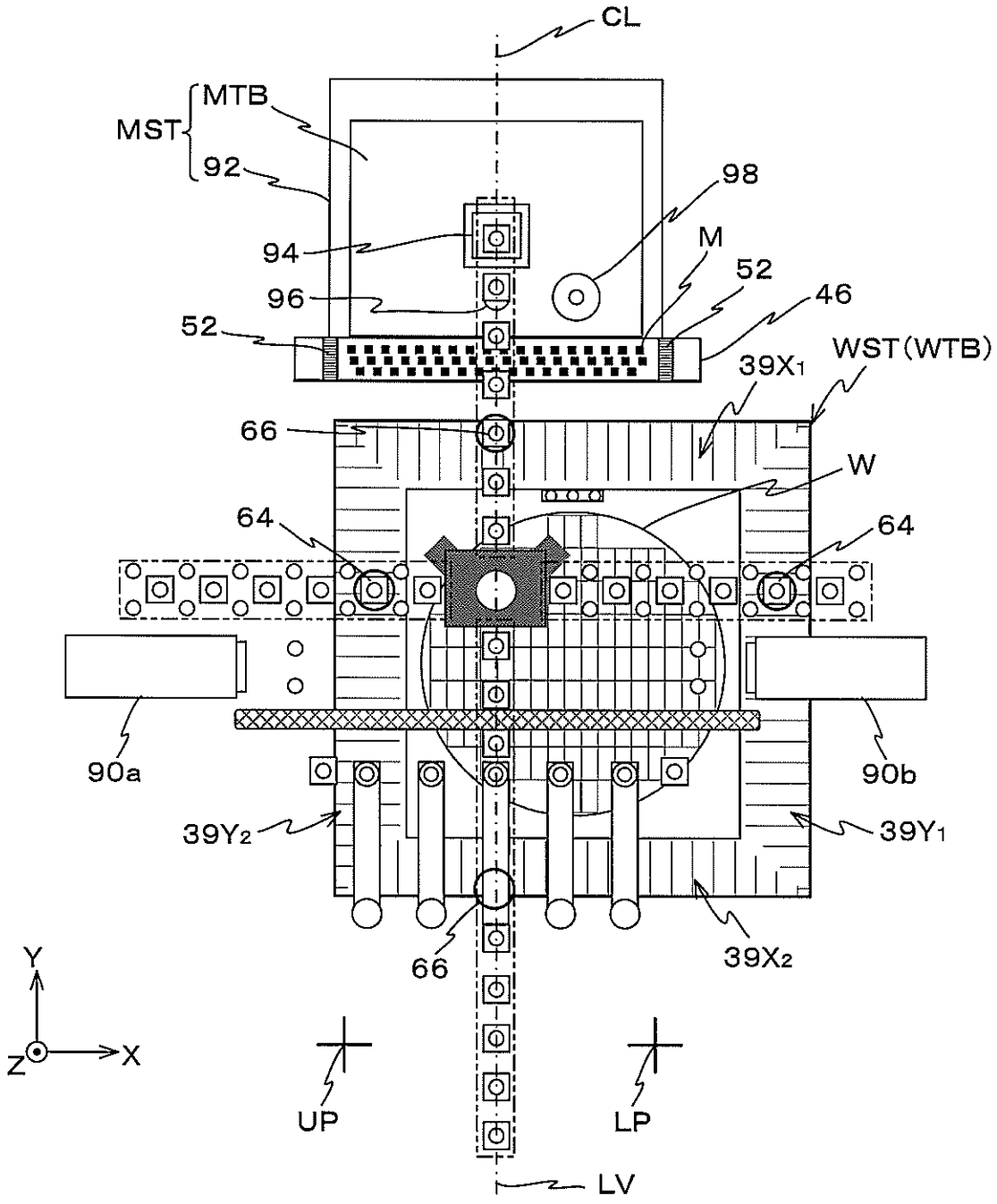

CL
MTB
MST
92
98
94
M
52
96
46
52
WST(WTB)
39X1
66
W
64
64
90a
90b
39Y2
39Y1
66
39X2
Y
Z
X
UP
LP
LV

Fig. 28

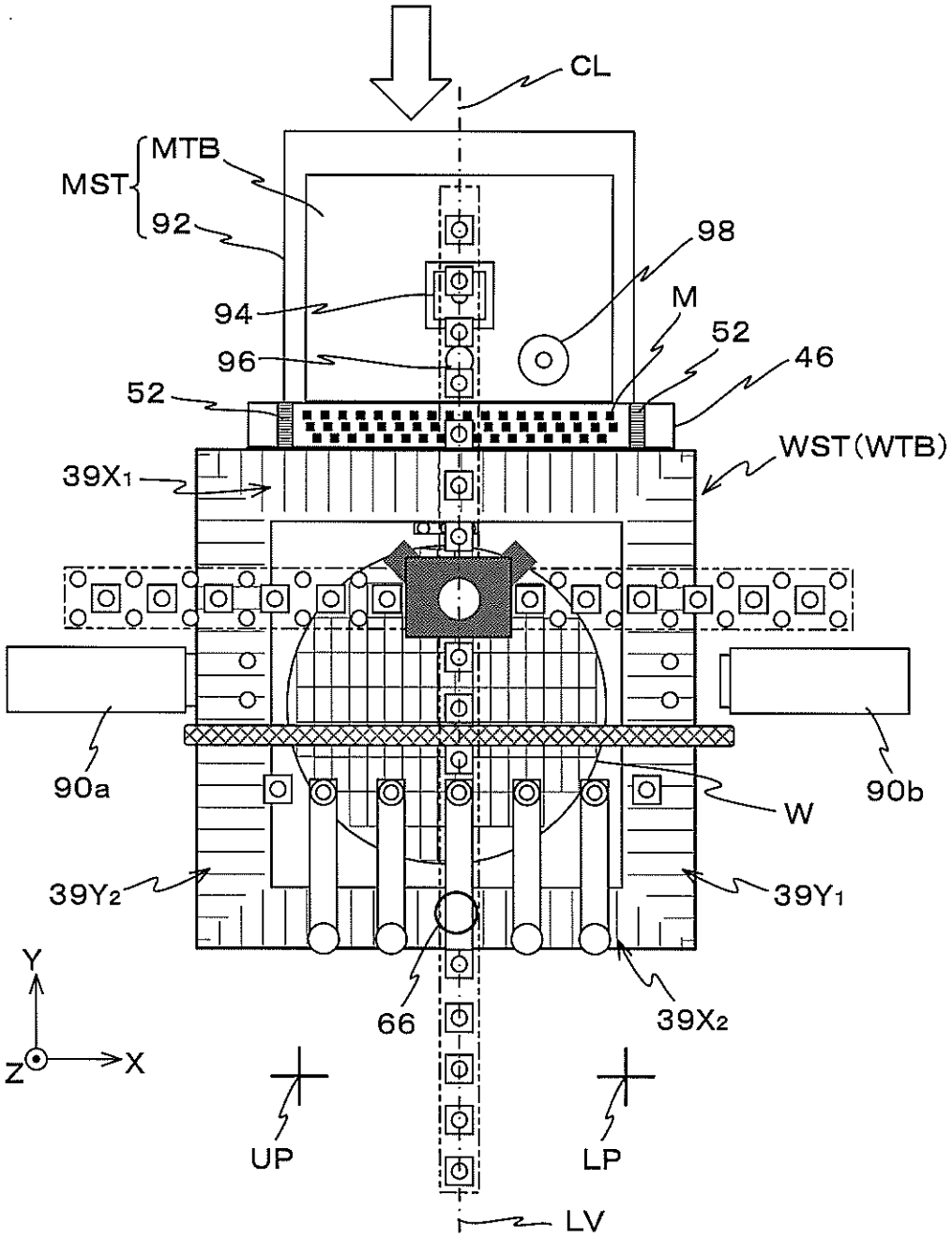

CL
MTB
MST
92
98
94
M
52
46
96
52
WST(WTB)
39X1
90a
90b
W
39Y2
39Y1
66
39X2
Y
Z
X
UP
LP
LV

Fig. 29

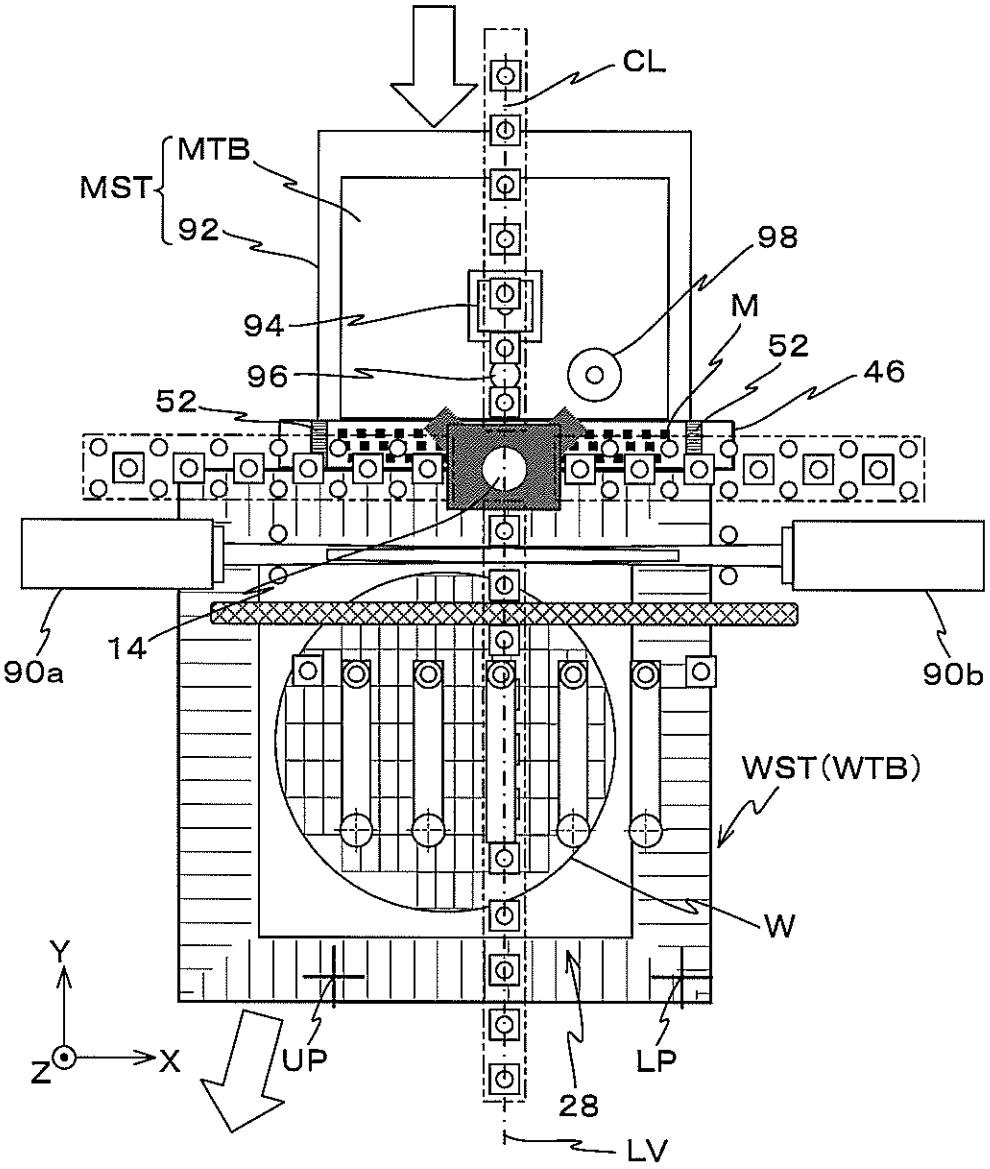


Fig. 30

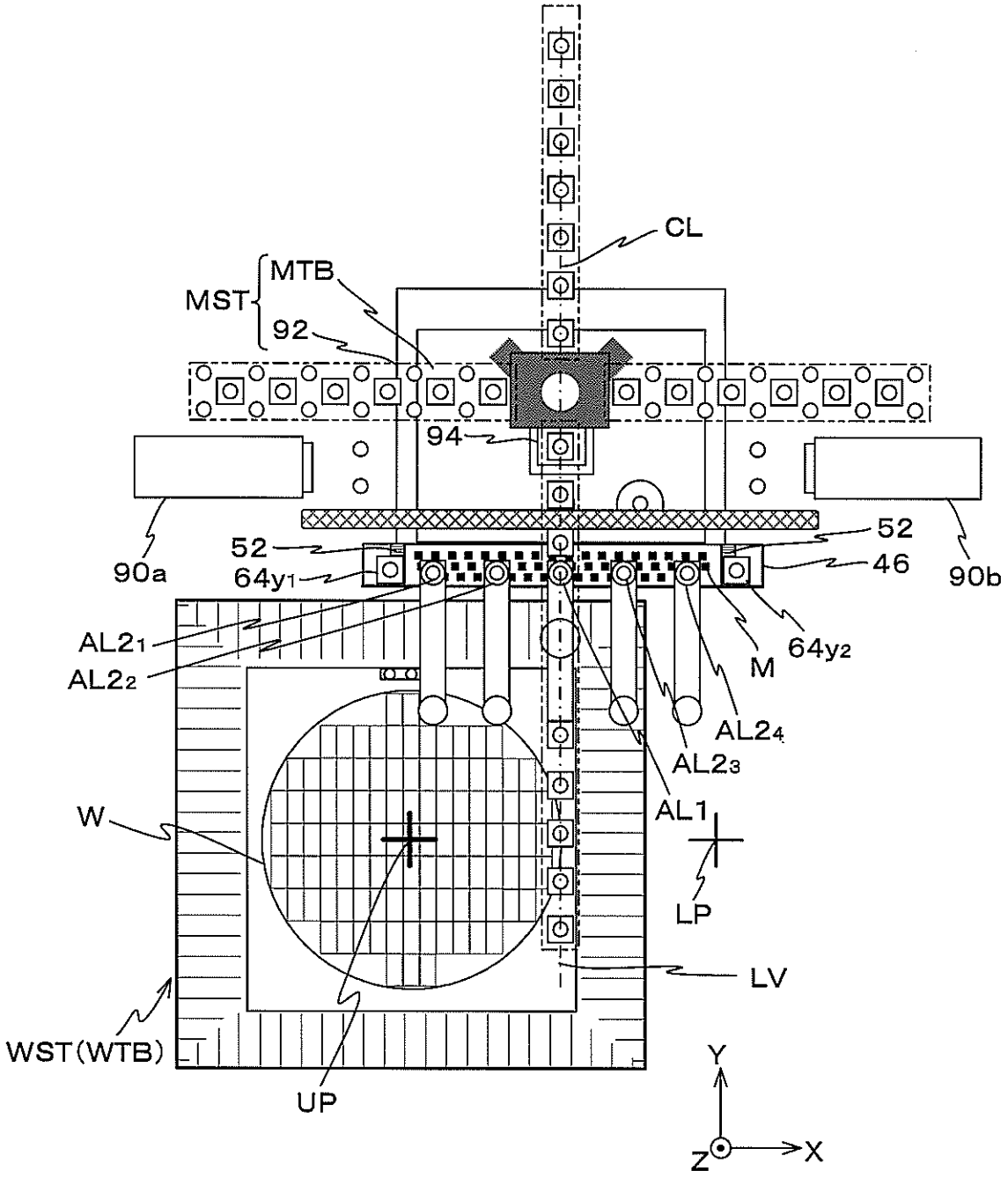

CL
MST
MTB
92
94
90a
90b
52
52
64y1
46
AL21
AL22
64y2
M
AL24
AL23
AL1
W
LP
LV
WST(WTB)
UP
Y
Z
X

Fig. 31

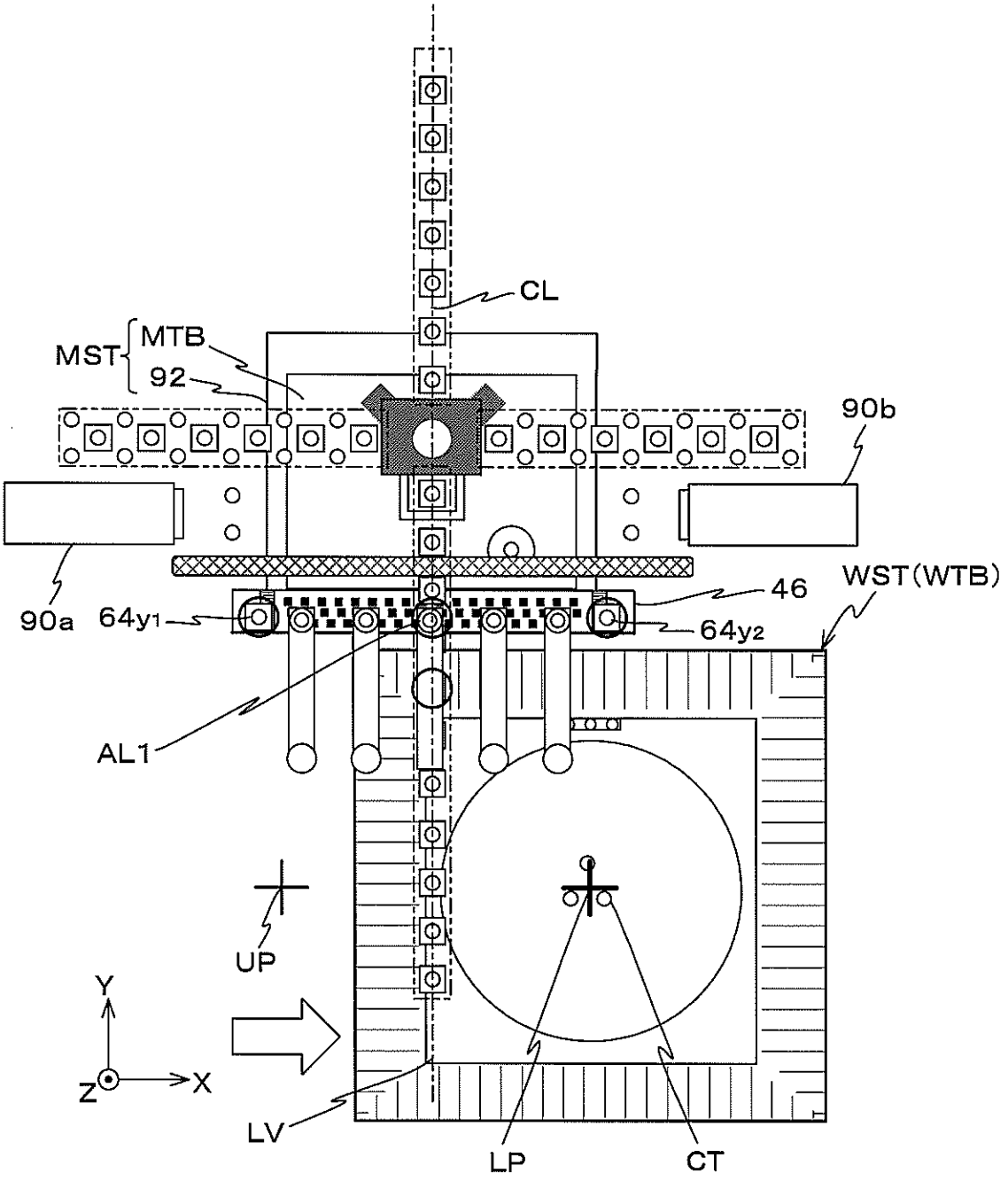


Fig. 32

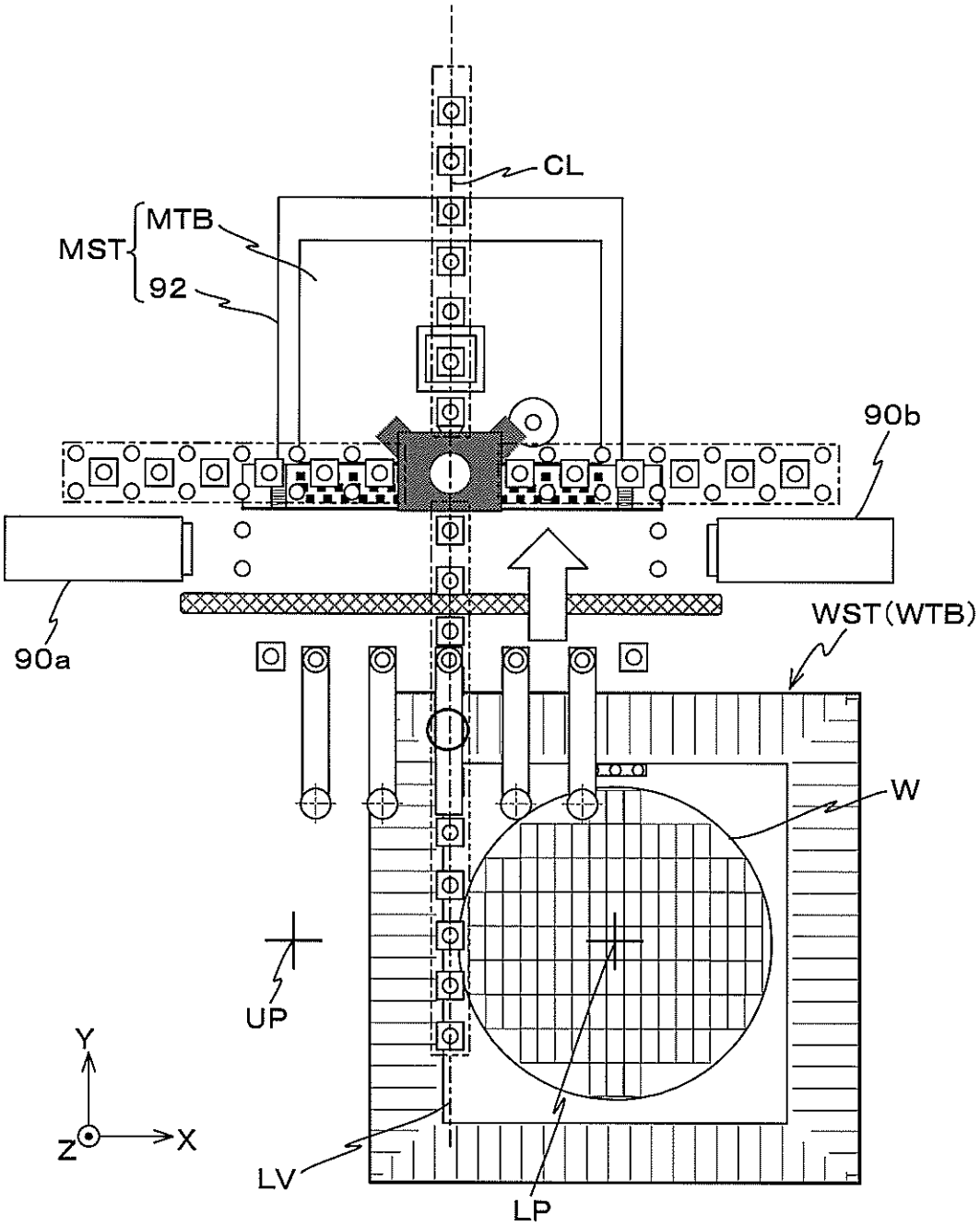


Fig. 33

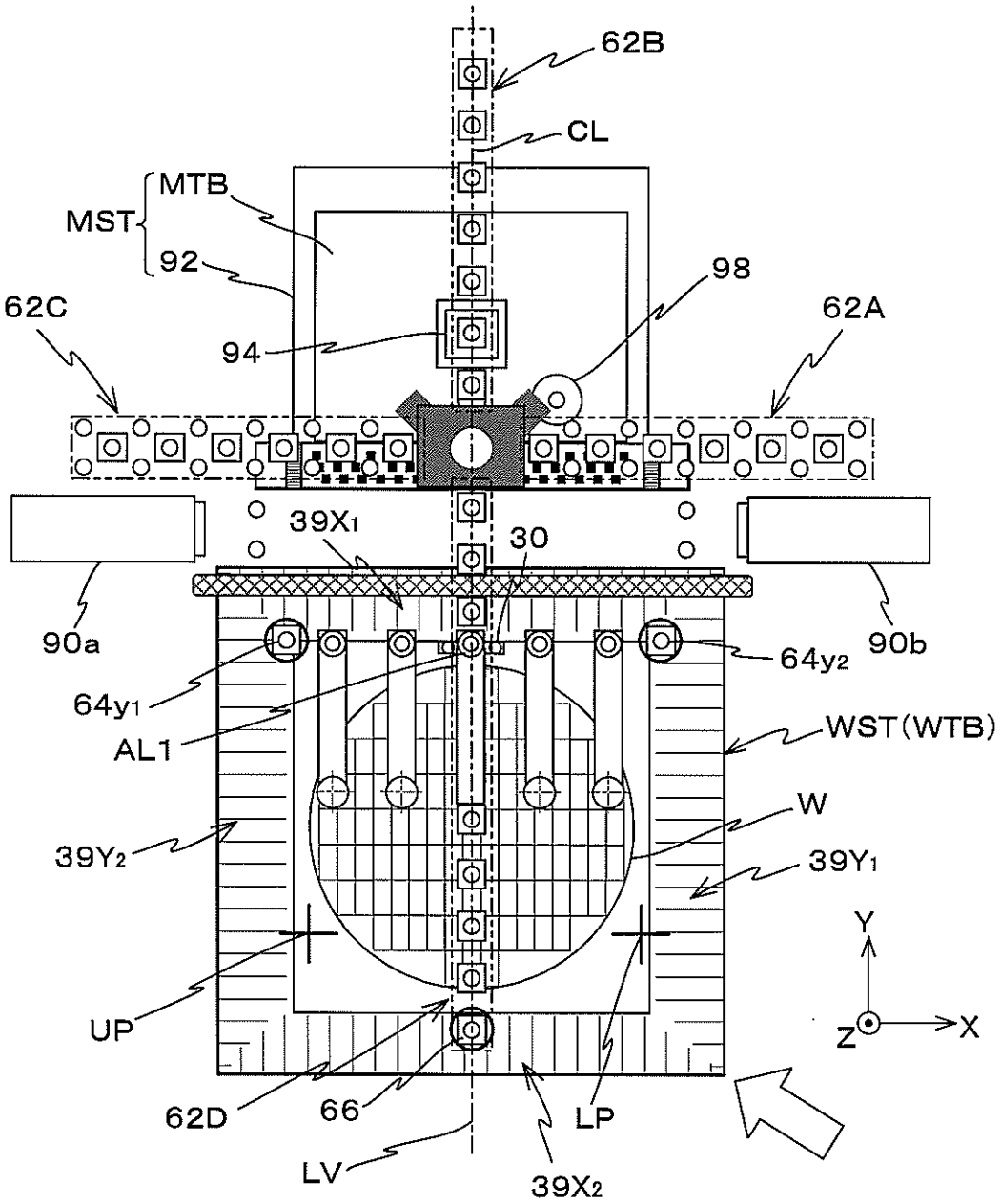

62B
CL
MTB
MST
92
98
62C
94
62A
39X1
30
90a
90b
64y2
64y1
AL1
WST(WTB)
W
39Y2
39Y1
Y
UP
Z
X
62D
66
LP
LV
39X2

Fig. 34

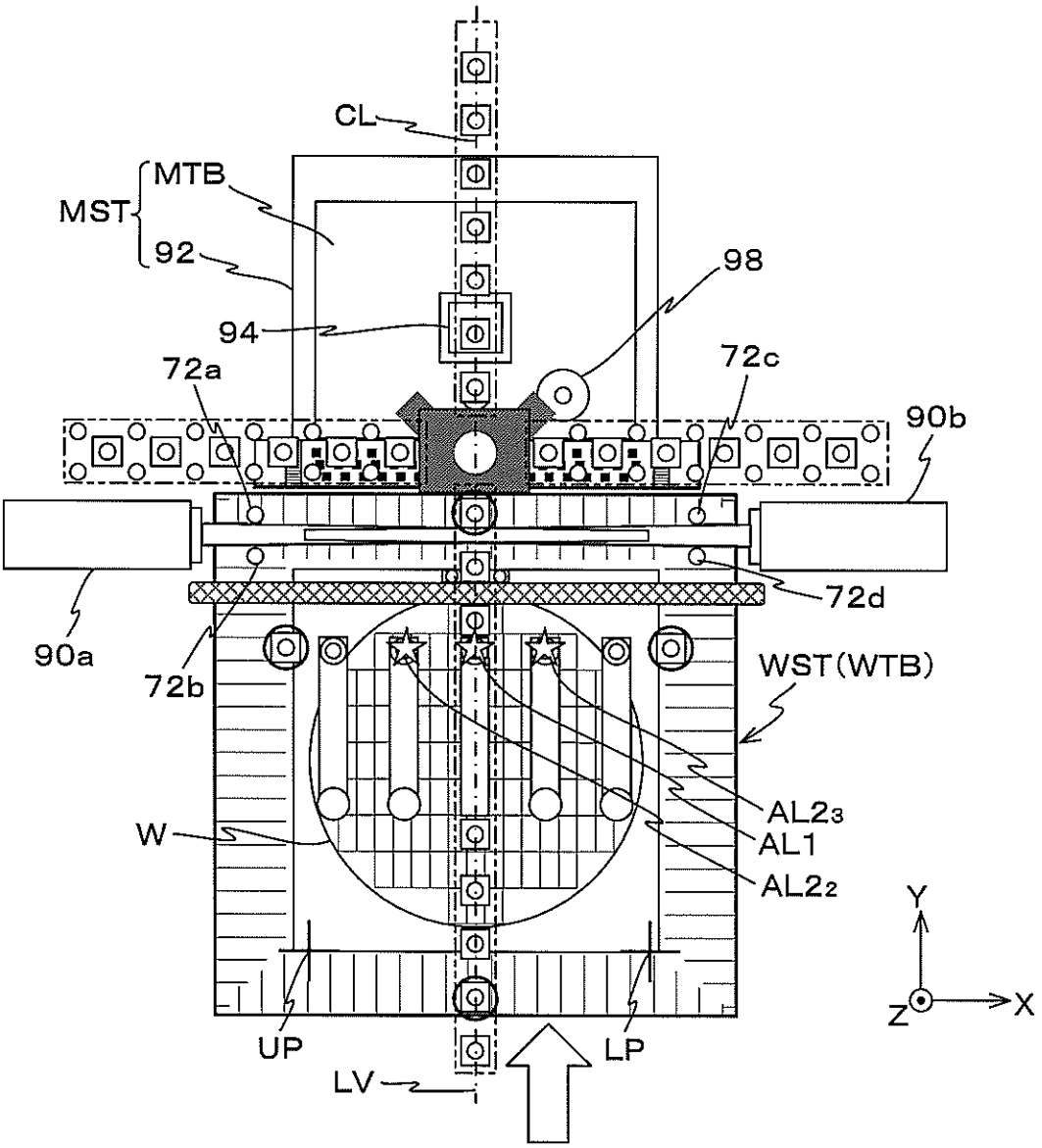

CL
MTB
MST
92
98
94
72a
72c
90b
72d
90a
72b
WST(WTB)
AL2₃
AL1
AL2₂
W
Y
Z
X
UP
LP
LV

Fig. 35

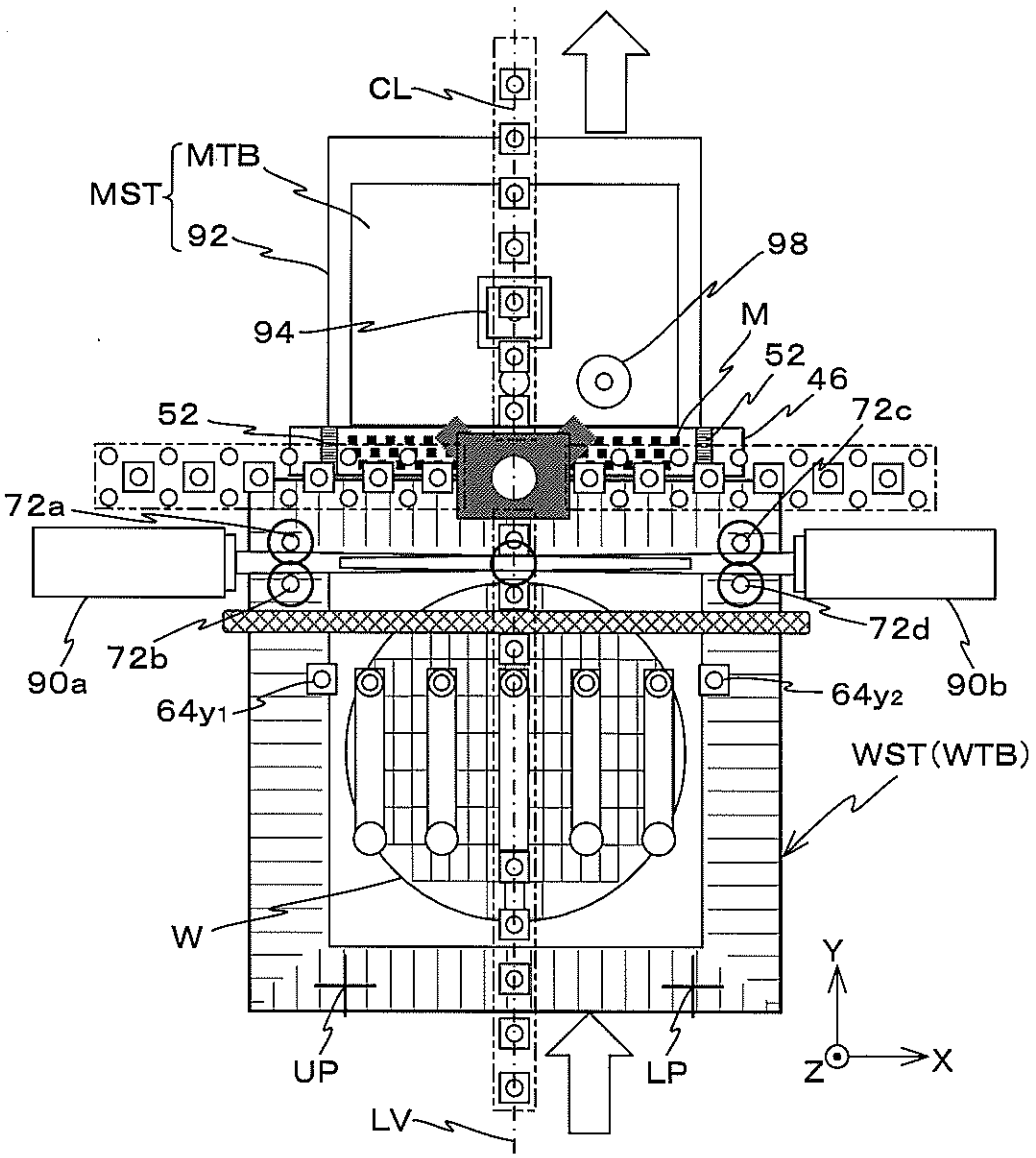

CL
MTB
MST
92
98
94
M
52
46
72c
52
72a
72d
90a
72b
90b
64y1
64y2
WST(WTB)
W
Y
Z
X
UP
LP
LV

Fig. 36

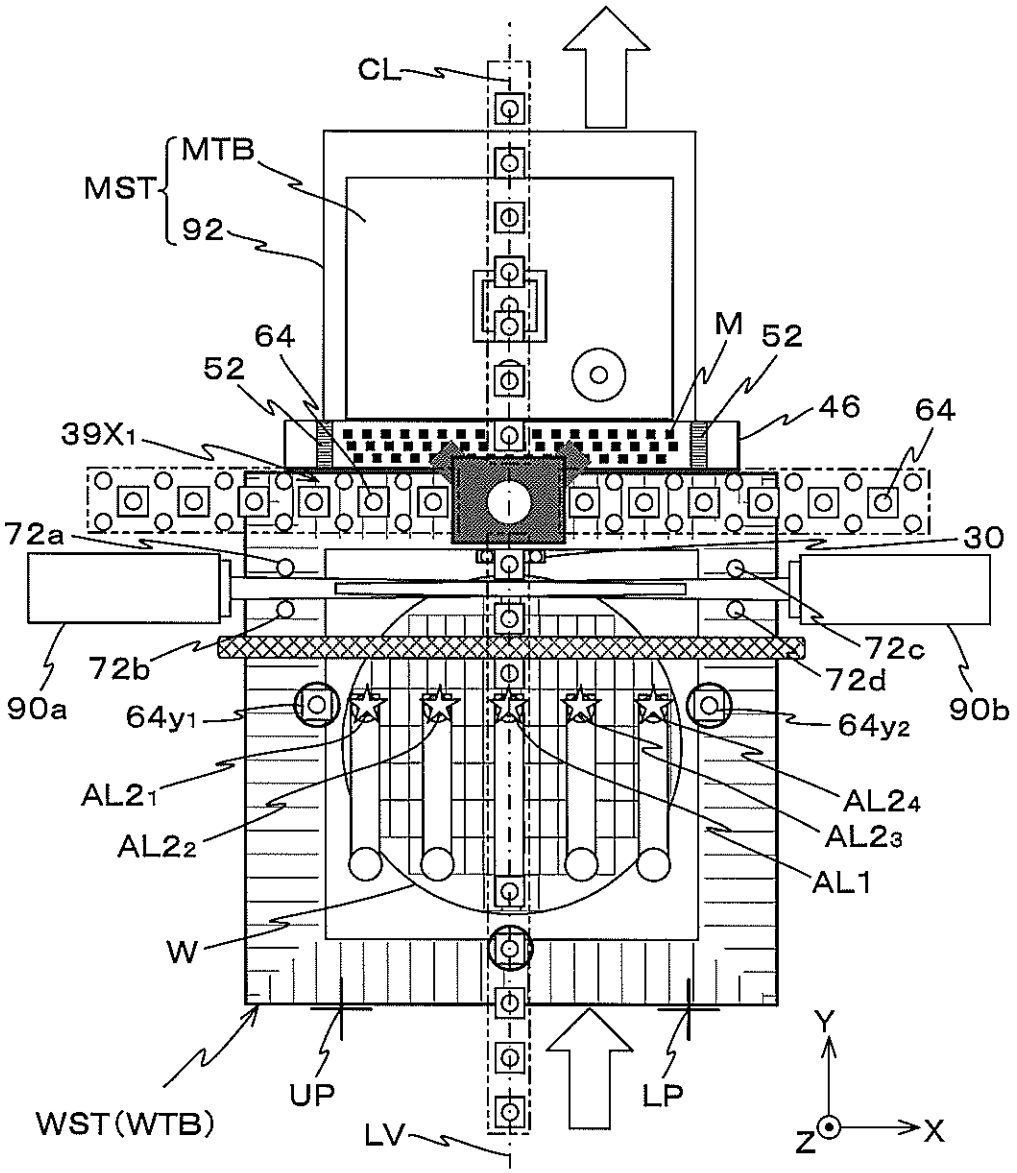

CL
MST
MTB
92
64
52
M
52
46
64
39X1
72a
30
72b
72c
72d
90a
90b
64y1
64y2
AL21
AL22
AL24
AL23
AL1
W
WST(WTB)
UP
LP
LV
Y
Z
X

Fig. 37

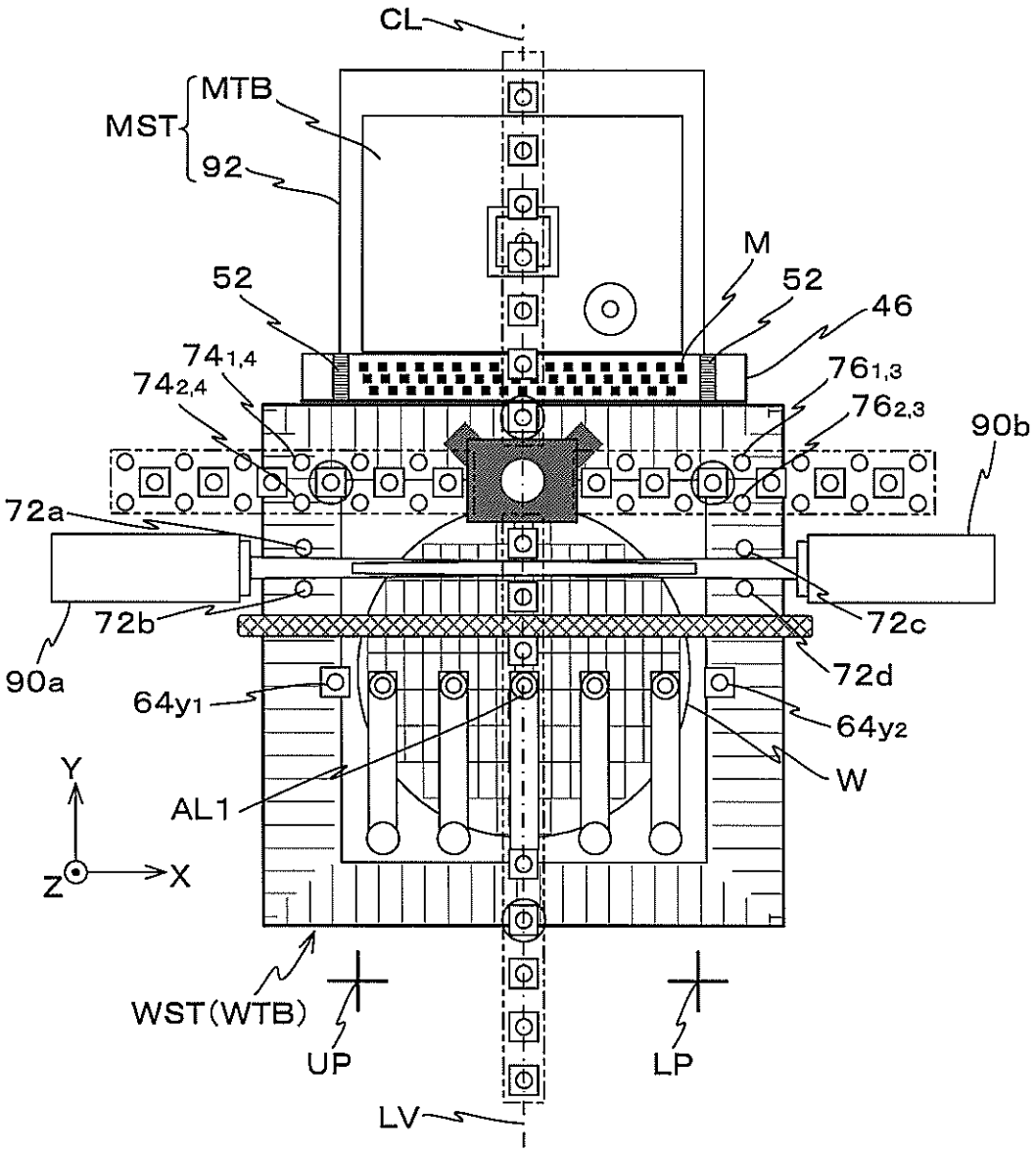

CL
MTB
MST
92
52
M
52
46
74 1,4
74 2,4
76 1,3
76 2,3
90b
72a
72b
72c
72d
90a
64y1
64y2
W
AL1
Y
Z
X
WST(WTB)
UP
LP
LV

Fig. 38

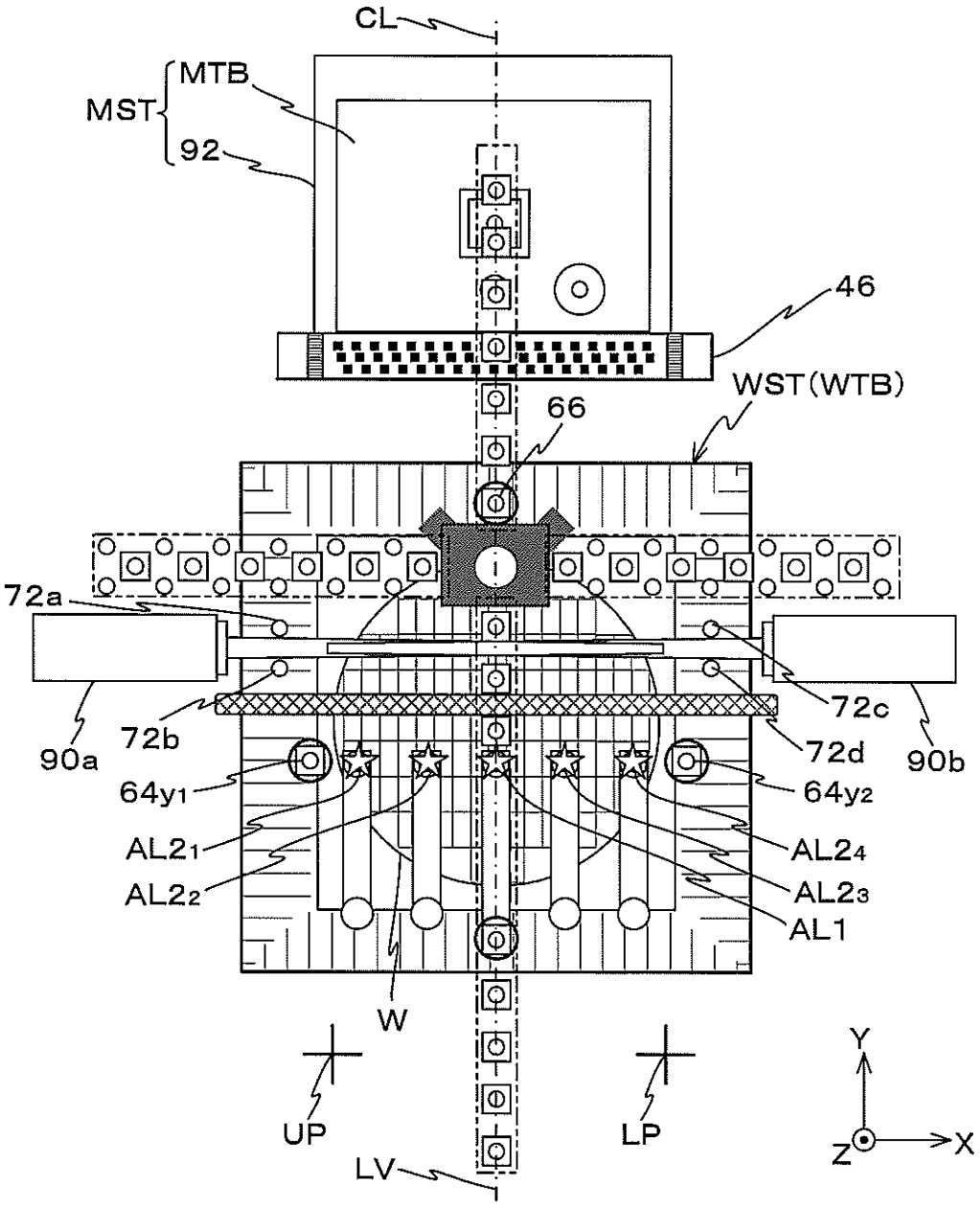

CL
MTB
MST
92
46
WST(WTB)
66
72a
72b
72c
72d
90a
90b
64y1
64y2
AL21
AL22
AL23
AL24
AL1
W
UP
LP
LV
Y
Z
X

Fig. 39

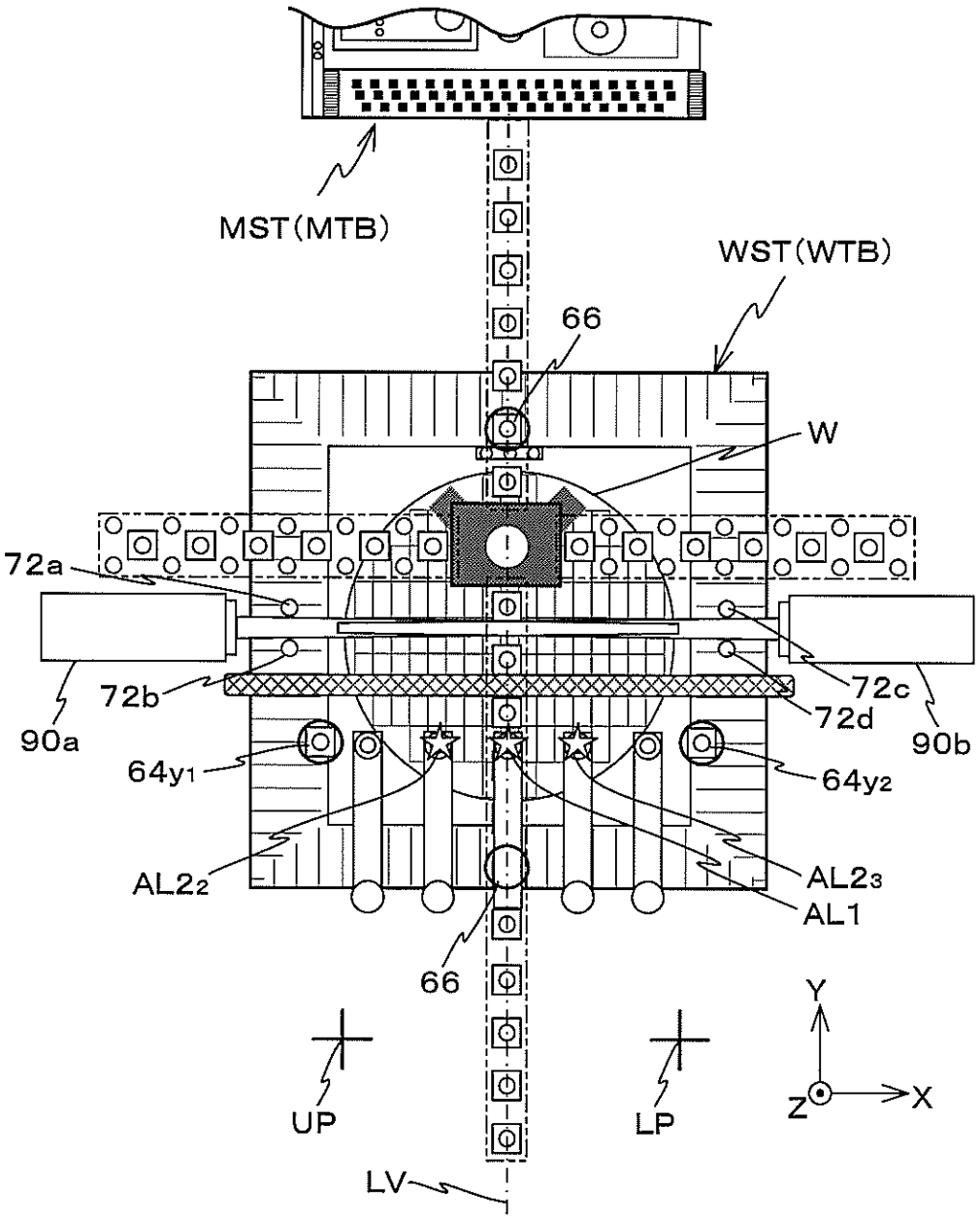

MST(MTB)
WST(WTB)
66
W
72a
72b
72c
72d
90a
90b
64y1
64y2
AL22
AL23
AL1
66
UP
LP
LV
Y
Z
X

Fig. 40

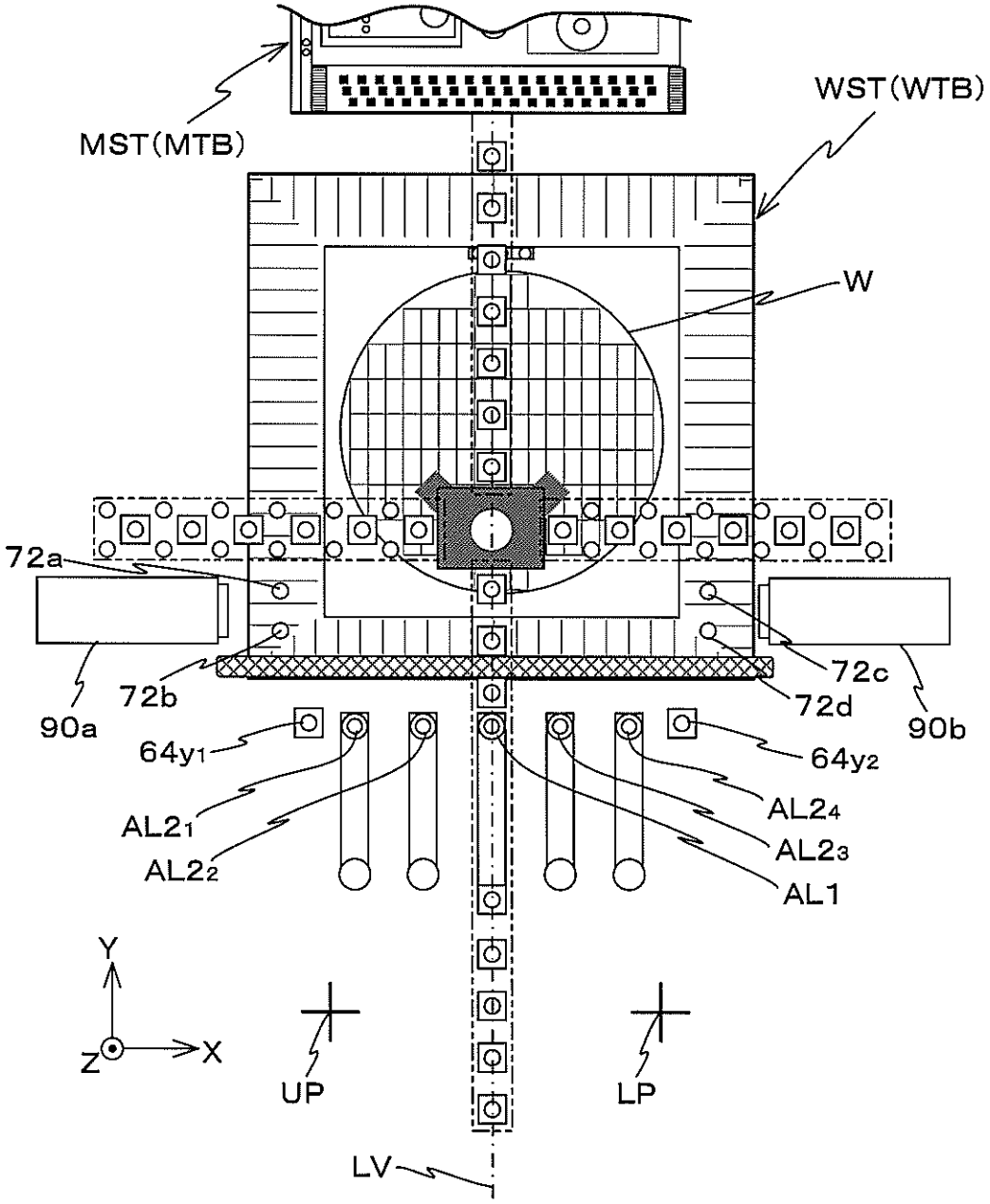

MST(MTB)
WST(WTB)
W
72a
72b
72c
72d
90a
90b
64y1
64y2
AL21
AL22
AL24
AL23
AL1
Y
Z
X
UP
LP
LV

Fig. 41

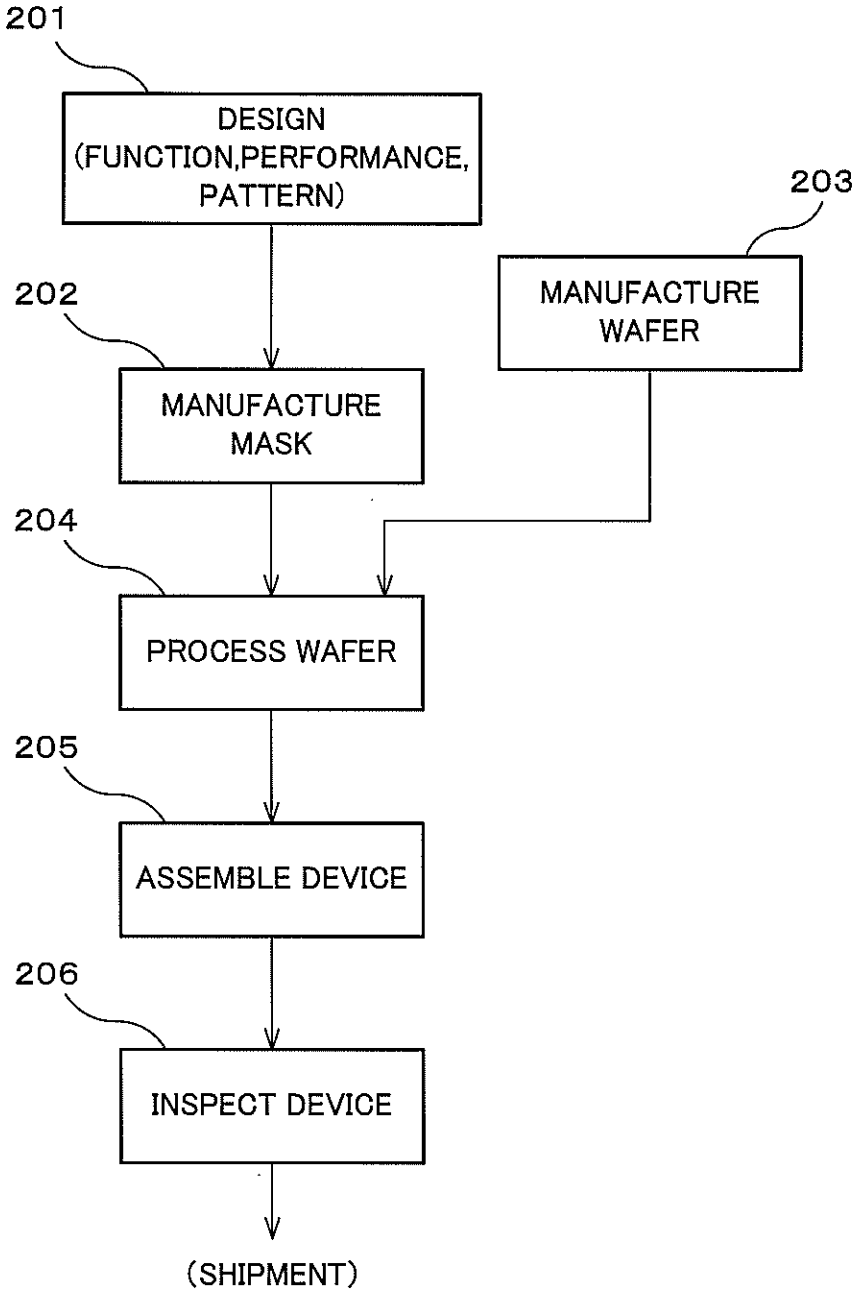
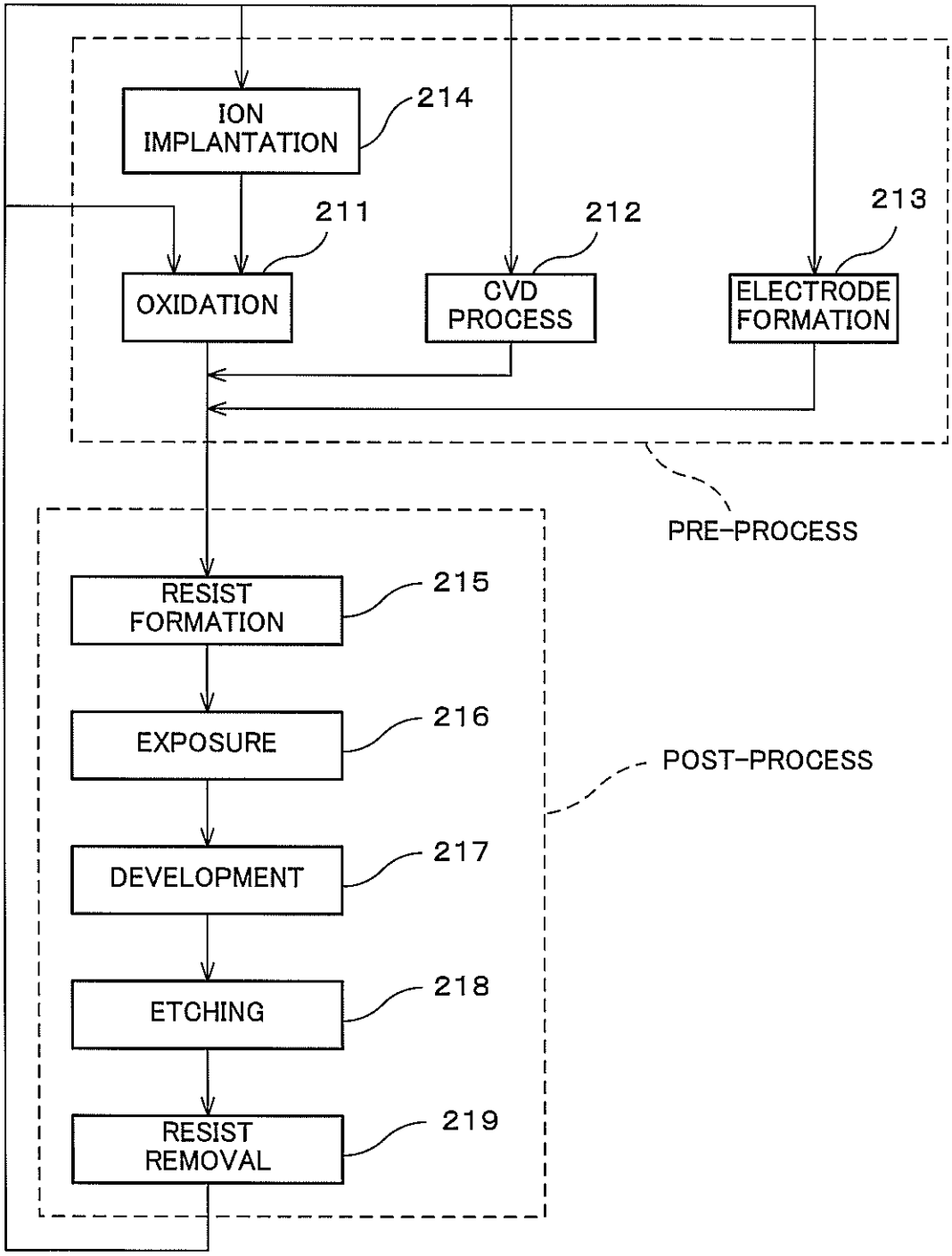

201
DESIGN
(FUNCTION,PERFORMANCE,
PATTERN)
203
MANUFACTURE
WAFER
202
MANUFACTURE
MASK
204
PROCESS WAFER
205
ASSEMBLE DEVICE
206
INSPECT DEVICE
(SHIPMENT)

Fig. 42


ION IMPLANTATION
214
211
212
213
OXIDATION
CVD PROCESS
ELECTRODE FORMATION
PRE-PROCESS
RESIST FORMATION
215
EXPOSURE
216
POST-PROCESS
DEVELOPMENT
217
ETCHING
218
RESIST REMOVAL
219