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(54) **Title:**
SUBSTRATE HOLDING DEVICE, EXPOSURE APPARATUS HAVING SAME, EXPOSURE METHOD, METHOD FOR PRODUCING DEVICE, AND LIQUID REPELLENT PLATE

(57) **Abstract:**
ABSTRACT SUBSTRATE HOLDING DEVICE,EXPOSURE APPARATUS HAVING SAME, EXPOSURE METHOD, METHOD FOR PRODUCING DEVICE, AND LIQUID REPELLENT PLATE A substrate holder (PH) includes a base (PHB); a first holding portion (PH1) which is formed on the base (PHB) and which attracts and holds a substrate (P); and a second holding portion (PH2) which is formed on the base (PHB) and which attracts and holds a plate member (T) in the vicinity of the substrate (P) attracted and held by the first holding portion (PH1). In an exposure apparatus including such a substrate holder (PH), the plate can be exchanged easily, thereby making the maintenance of the apparatus easy. Consequently, such an exposure apparatus is suitable for immersion exposure. [FIGURE 2]

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ABSTRACT

SUBSTRATE HOLDING DEVICE,EXPOSURE APPARATUS HAVING SAME, EXPOSURE METHOD, METHOD FOR PRODUCING DEVICE, AND LIQUID REPELLENT PLATE

A substrate holder (PH) includes a base (PHB); a first holding portion (PH1) which is formed on the base (PHB) and which attracts and holds a substrate (P); and a second holding portion (PH2) which is formed on the base (PHB) and which attracts and holds a plate member (T) in the vicinity of the substrate (P) attracted and held by the first holding portion (PH1). In an exposure apparatus including such a substrate holder (PH), the plate can be exchanged easily, thereby making the maintenance of the apparatus easy. Consequently, such an exposure apparatus is suitable for immersion exposure.

[FIGURE 2]

Fig. 1

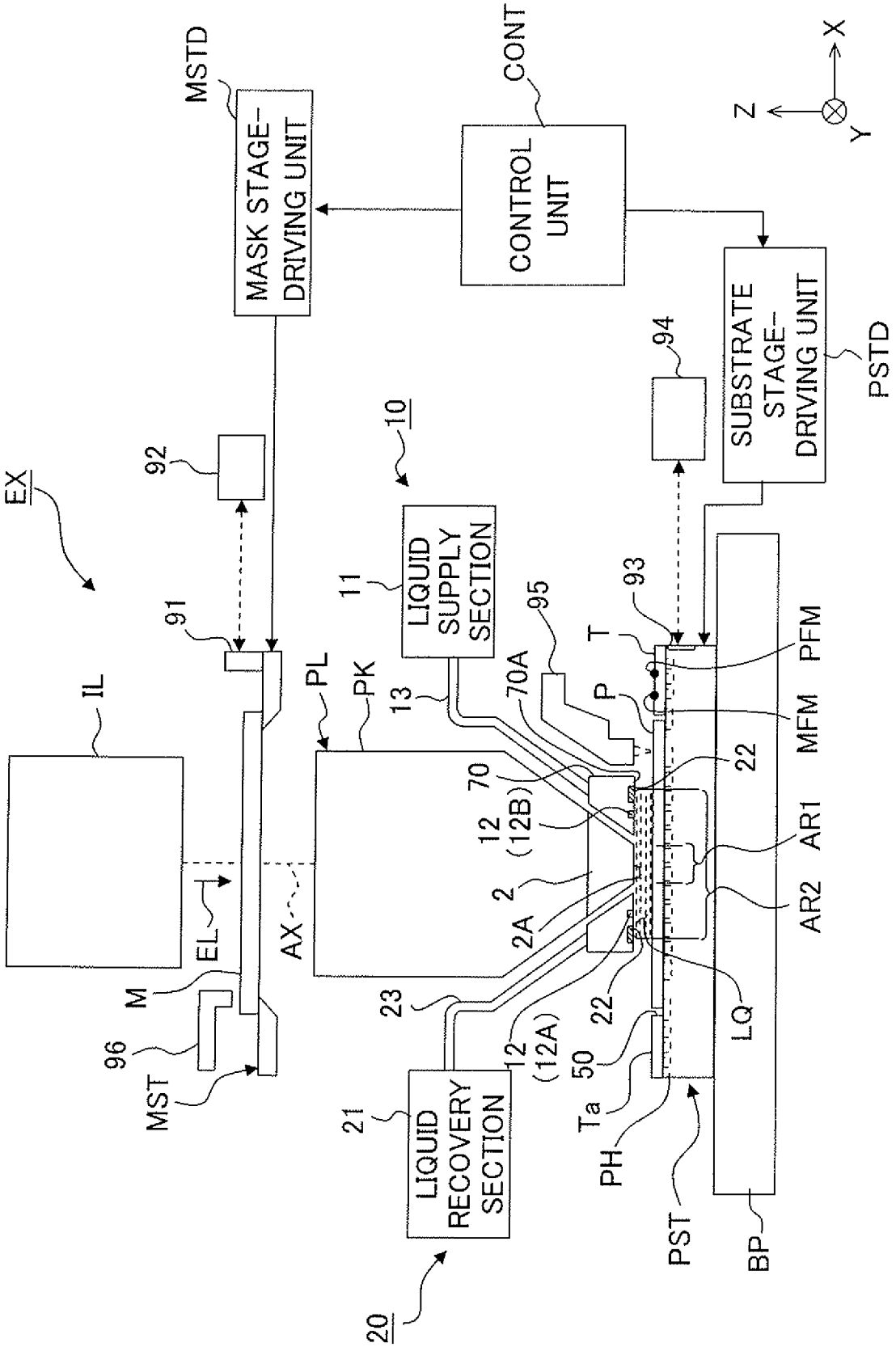

MSTD
MASK STAGE-DRIVING UNIT
CONT
CONTROL UNIT
X
Z
Y
EX
92
10
94
SUBSTRATE STAGE-DRIVING UNIT
PSTD
91
11
LIQUID SUPPLY SECTION
95
93
T
PFM
IL
PL
PK
13
70A
P
MFM
22
70
12
(12B)
AR1
2
AR2
EL
AX
2A
M
23
LQ
96
22
12
(12A)
50
MST
21
LIQUID RECOVERY SECTION
Ta
PH
PST
BP
20

Fig. 2

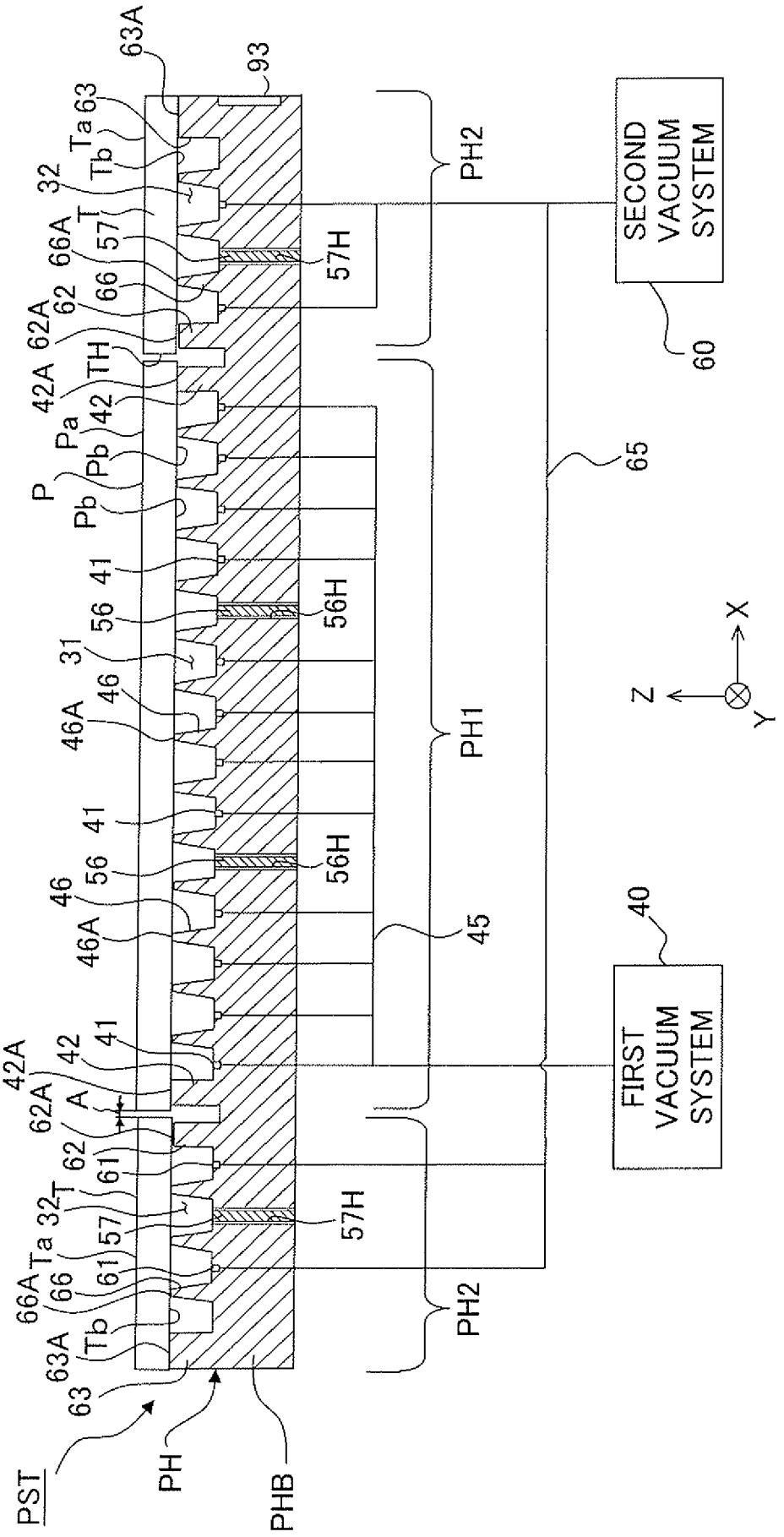

PST
PH
PHB
63
63A
93
Ta
Tb
32
T
66A
66
62
62A
TH
42A
42
Pa
Pb
P
41
56
31
46
46A
57
61
A
57H
56H
PH1
PH2
45
65
60
SECOND VACUUM SYSTEM
FIRST VACUUM SYSTEM
40
X
Y
Z

Fig. 3

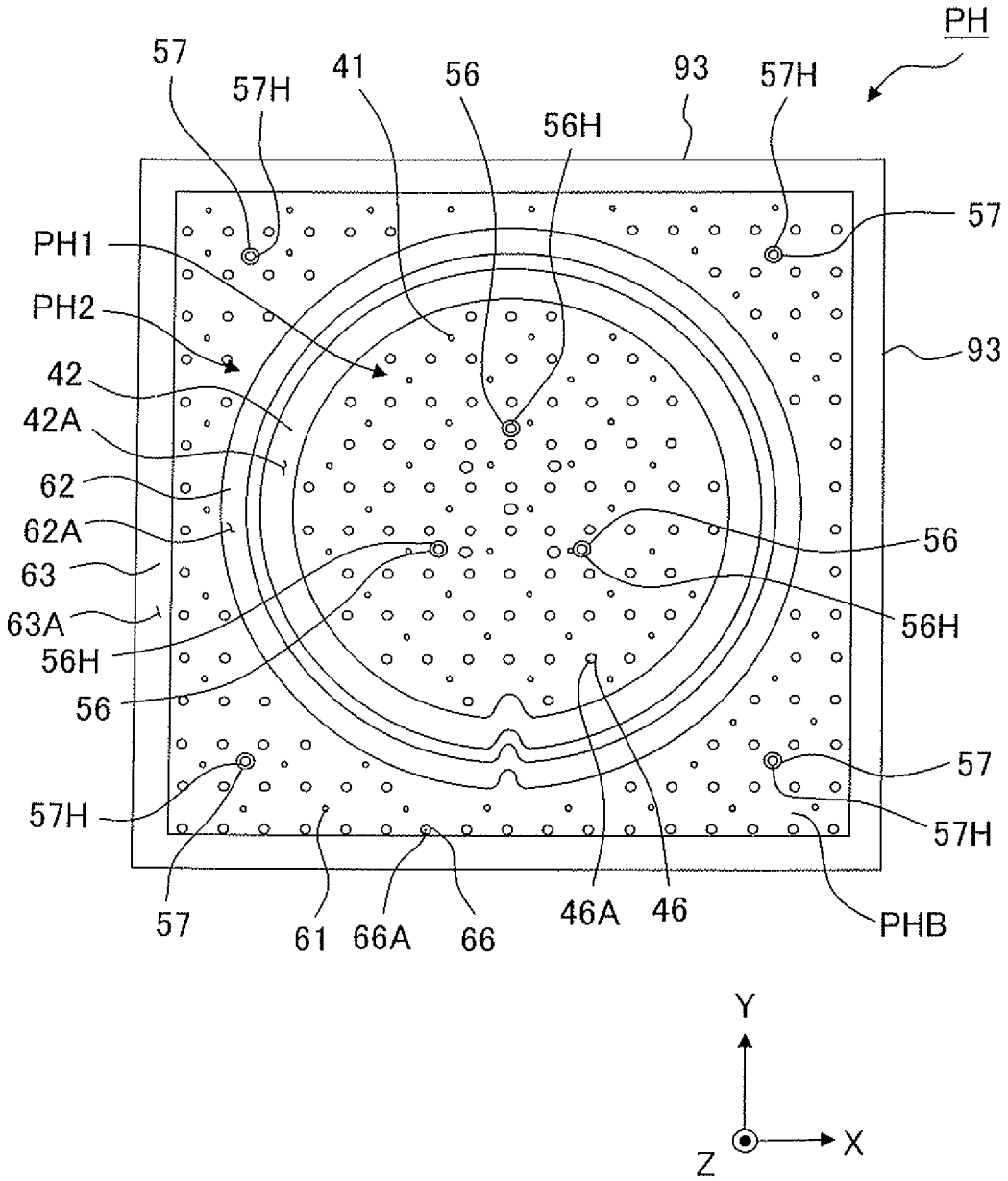

PH
57
57H
41
56
93
57H
56H
57
PH1
PH2
93
42
42A
62
62A
56
63
56H
63A
56H
56
57
57H
57H
57
61
66A
66
46A
46
PHB
Y
Z
X

Fig. 4

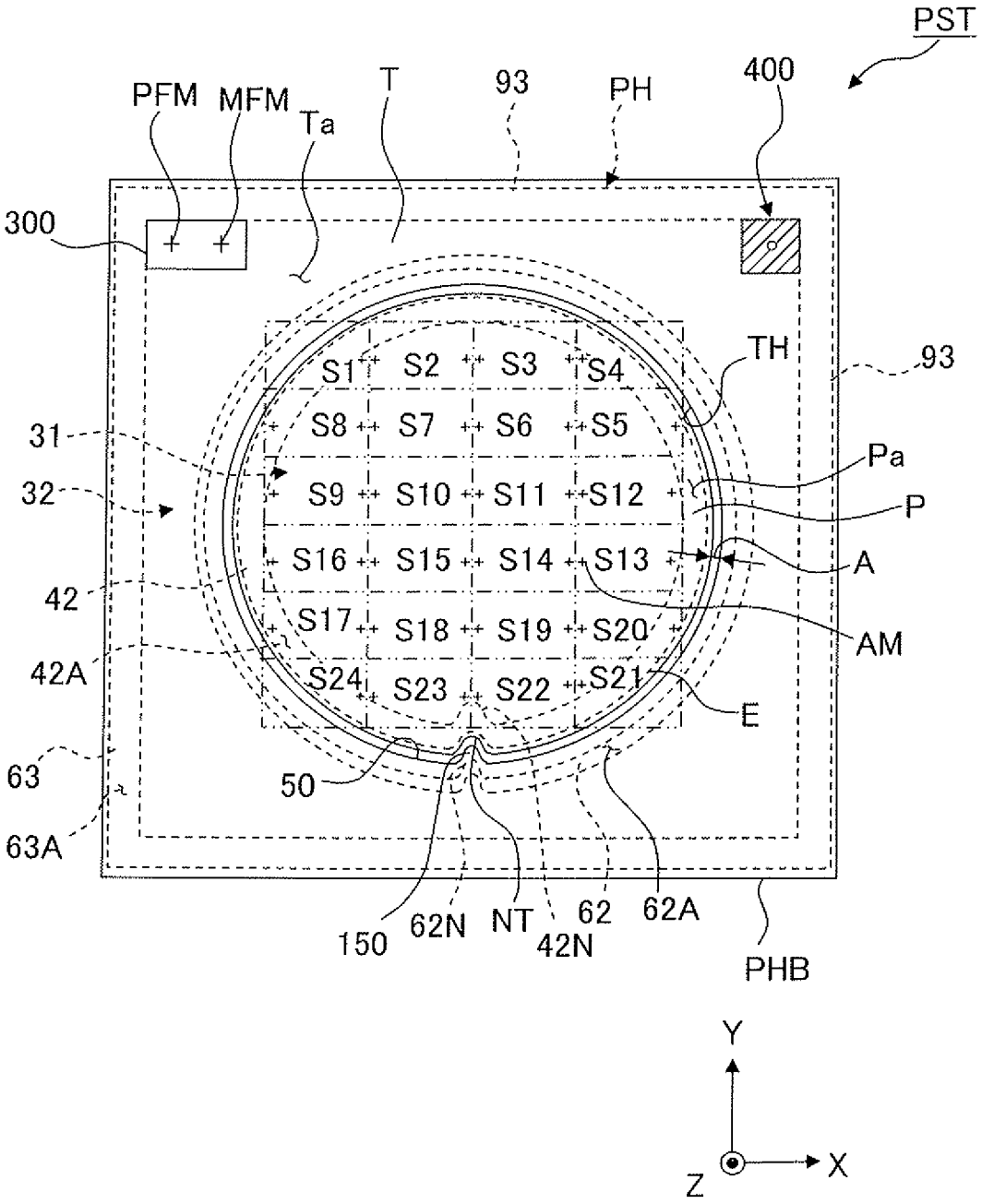

PST
PFM
MFM
Ta
T
93
PH
400
300
TH
93
S1
S2
S3
S4
S8
S7
S6
S5
S9
S10
S11
S12
S16
S15
S14
S13
S17
S18
S19
S20
S24
S23
S22
S21
31
32
42
42A
63
63A
50
Pa
P
A
AM
E
150
62N
NT
42N
62
62A
PHB
Y
X
Z

Fig. 5

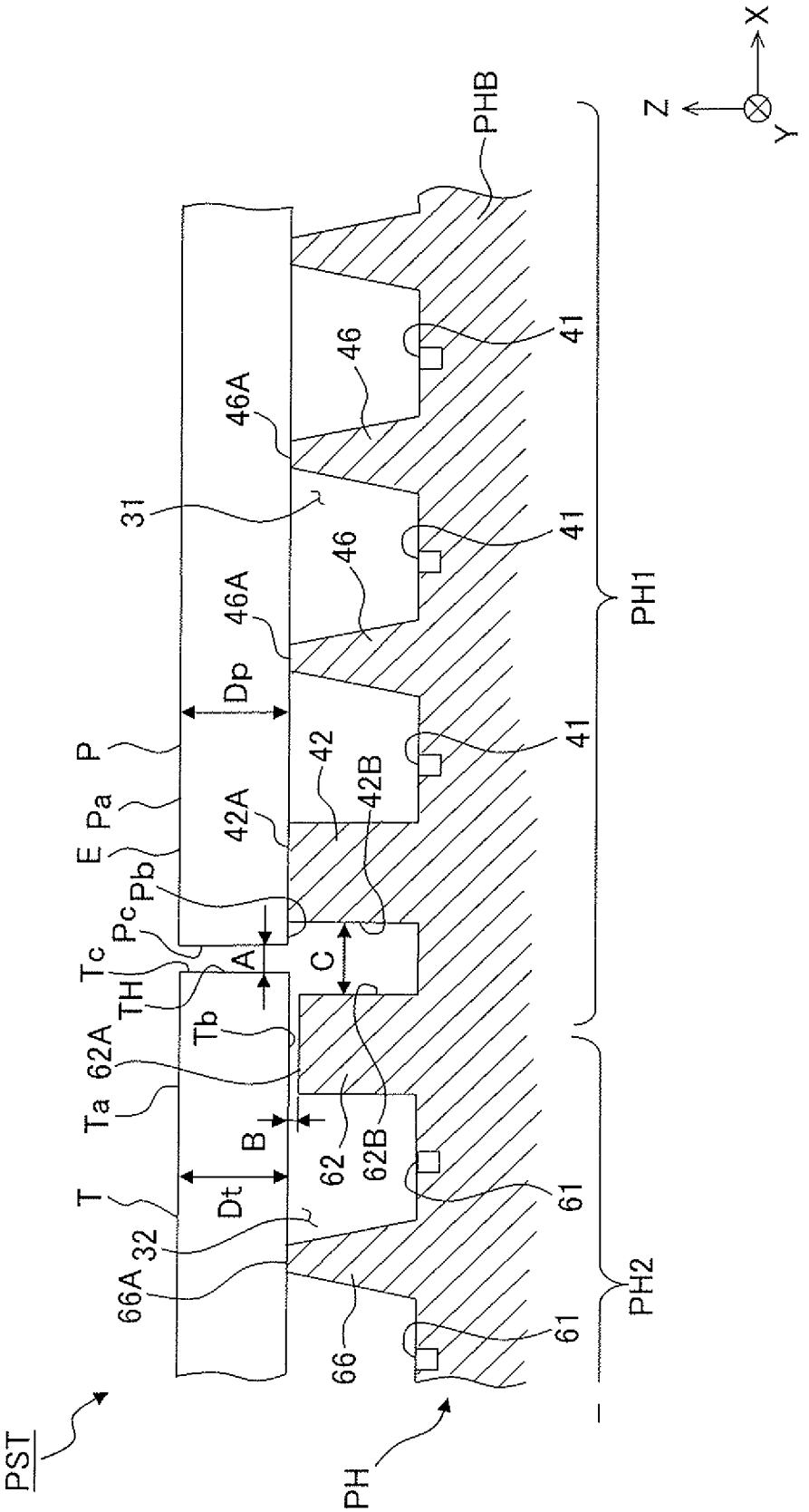

PHB
41
46
46A
31
PH1
Dp
P
Pa
E
Pb
Pc
Tc
TH
Tb
62A
Ta
T
Dt
32
66A
A
C
42
42A
42B
B
62
62B
61
PH2
66
PST
PH
X
Y
Z

Fig. 6

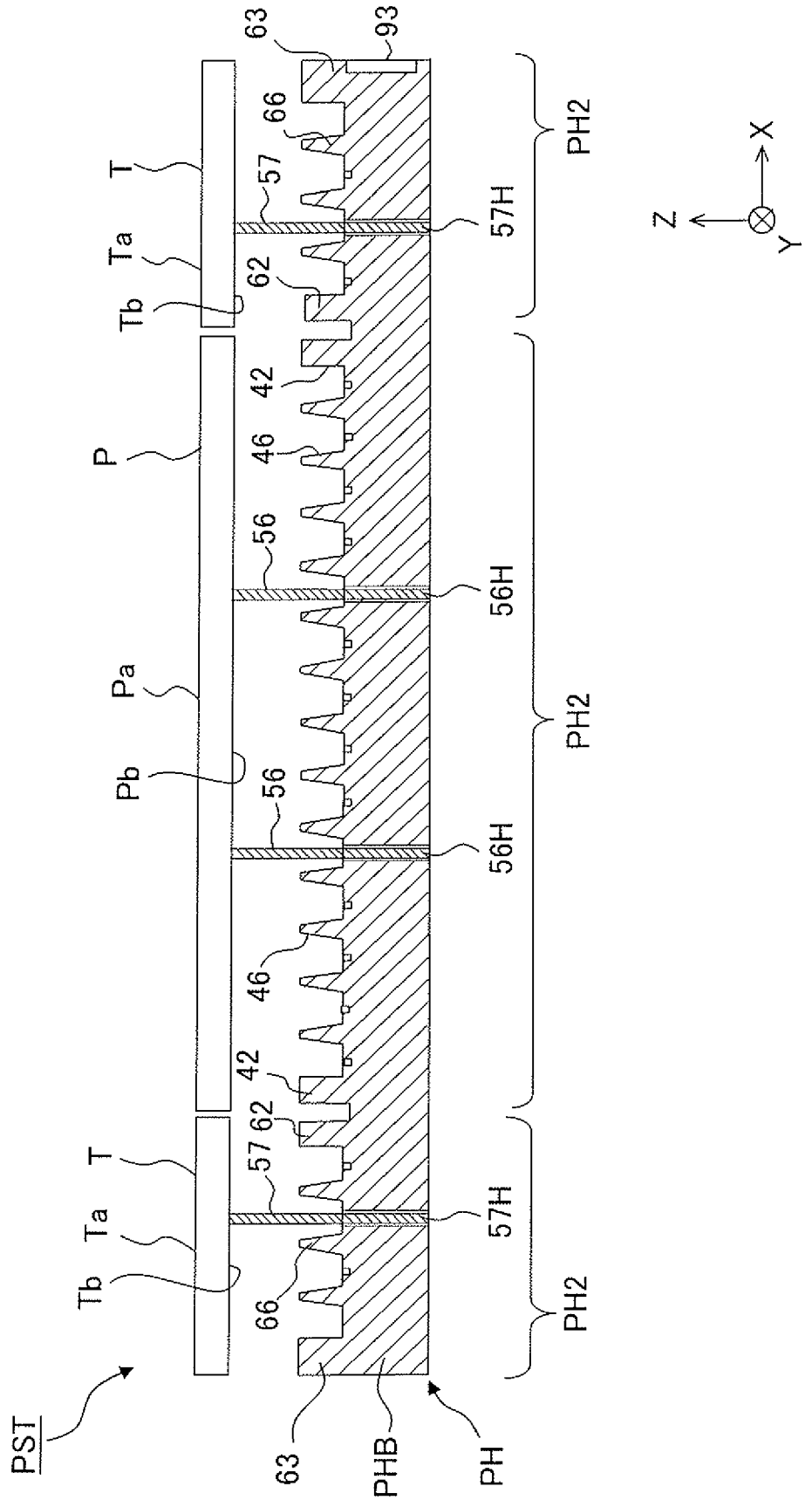


Fig. 7

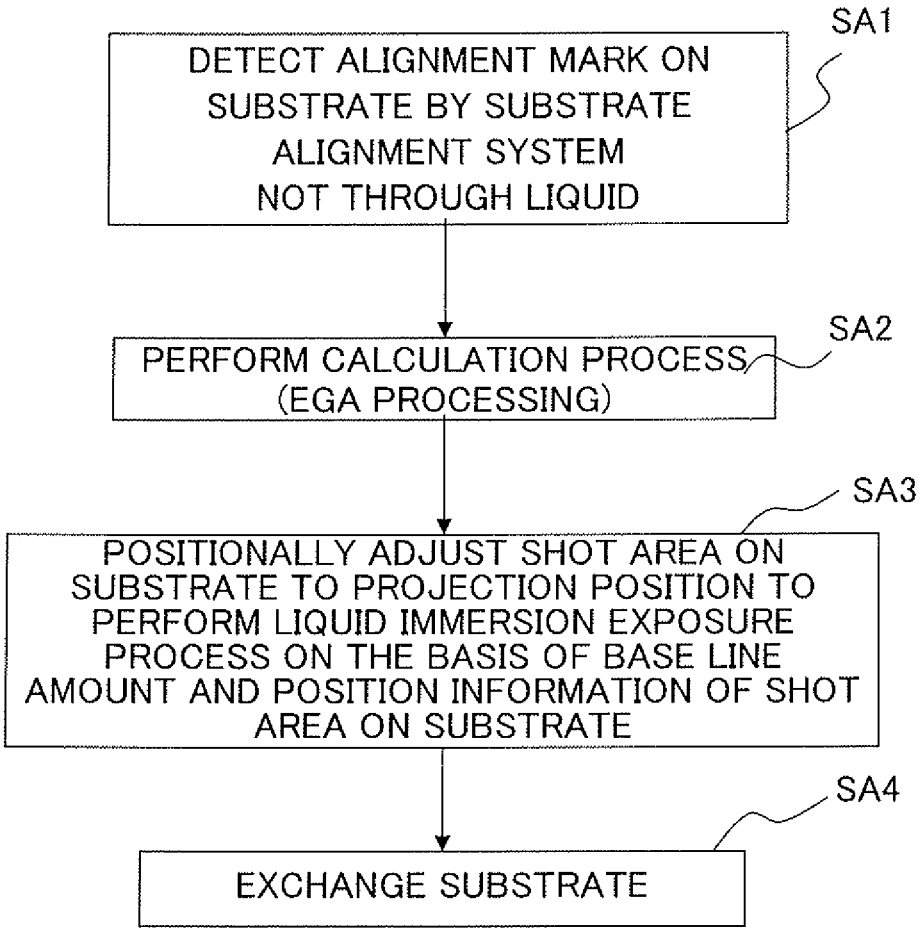

SA1
DETECT ALIGNMENT MARK ON SUBSTRATE BY SUBSTRATE ALIGNMENT SYSTEM NOT THROUGH LIQUID
SA2
PERFORM CALCULATION PROCESS (EGA PROCESSING)
SA3
POSITIONALLY ADJUST SHOT AREA ON SUBSTRATE TO PROJECTION POSITION TO PERFORM LIQUID IMMERSION EXPOSURE PROCESS ON THE BASIS OF BASE LINE AMOUNT AND POSITION INFORMATION OF SHOT AREA ON SUBSTRATE
SA4
EXCHANGE SUBSTRATE

Fig. 8

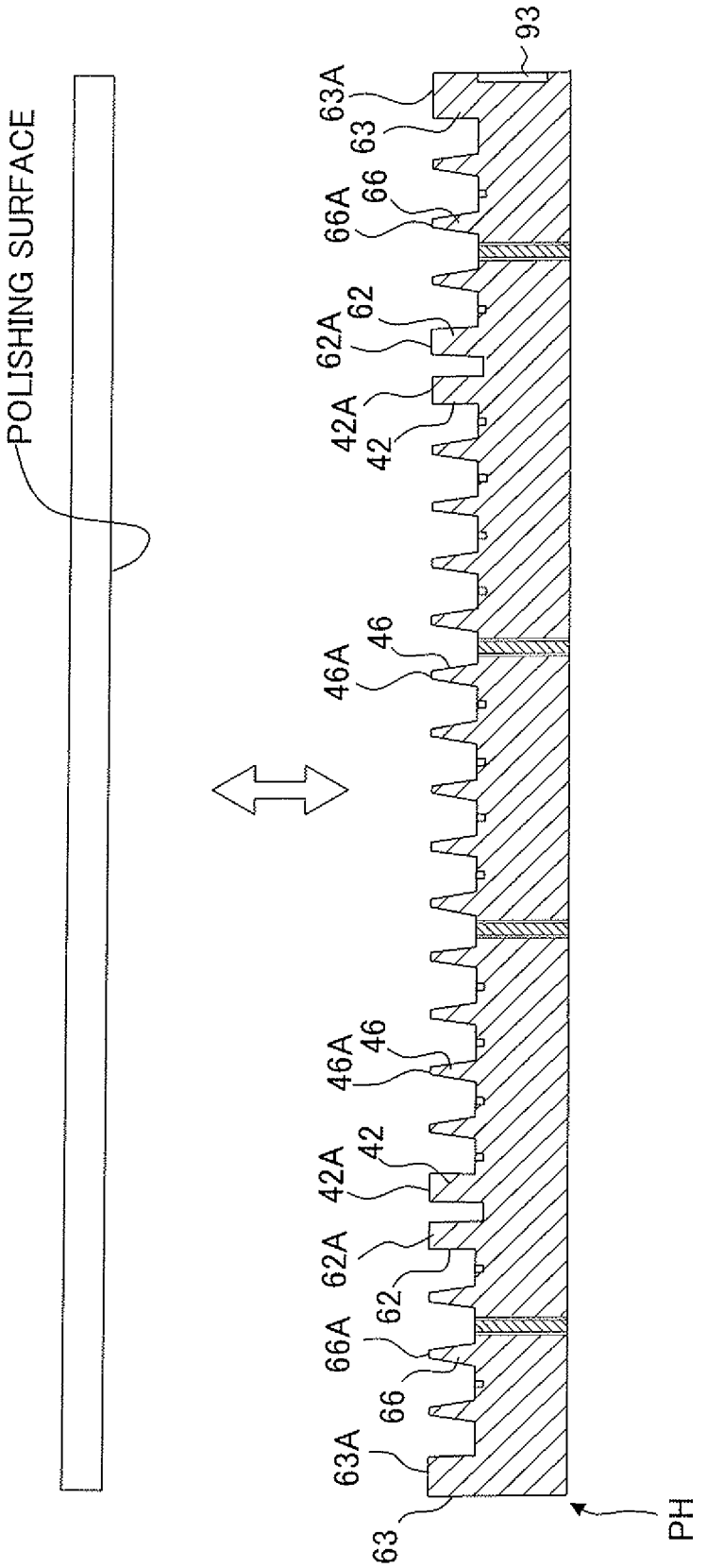
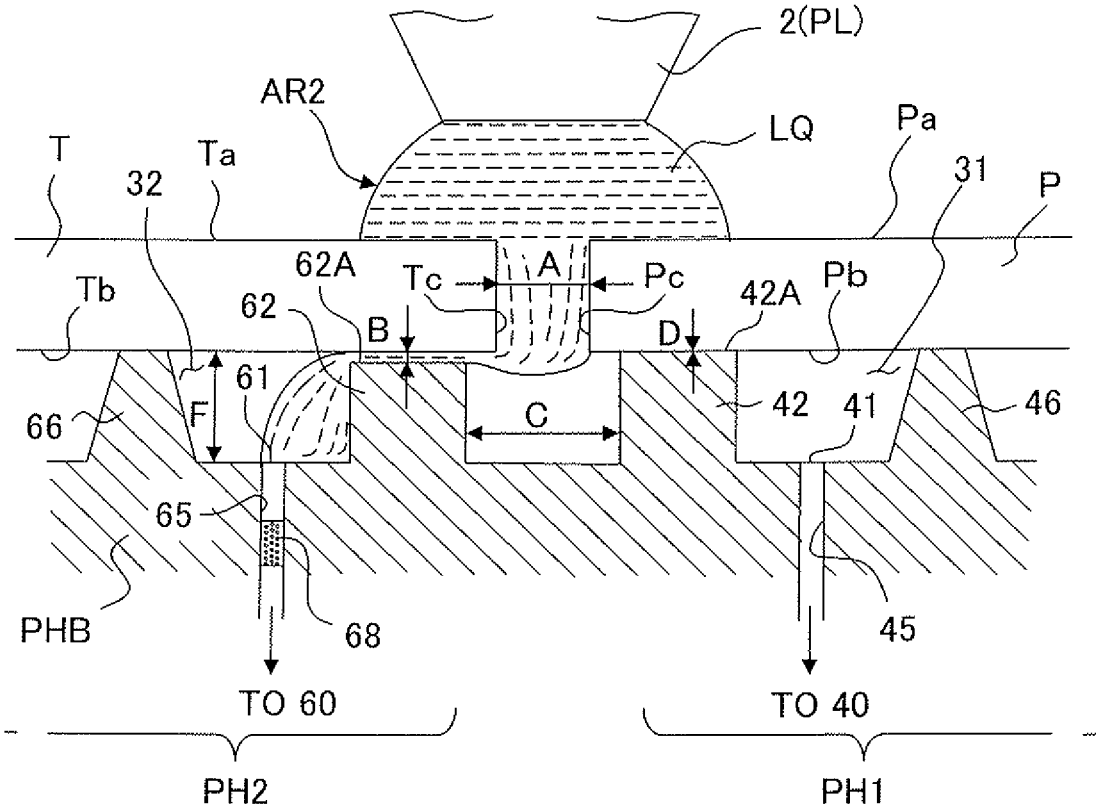

POLISHING SURFACE
93
63A
63
66A
66
62A
62
42A
42
46A
46
46A
46
42A
42
62A
62
66A
66
63A
63
PH

Fig. 9


2(PL)
AR2
LQ
Pa
T
Ta
32
31
P
62A
Tc
A
Pc
42A
Pb
Tb
62
B
D
61
F
C
42
41
46
66
65
PHB
68
45
TO 60
TO 40
PH2
PH1

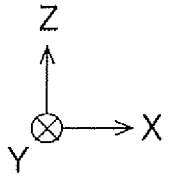

Z
X
Y

Fig. 10

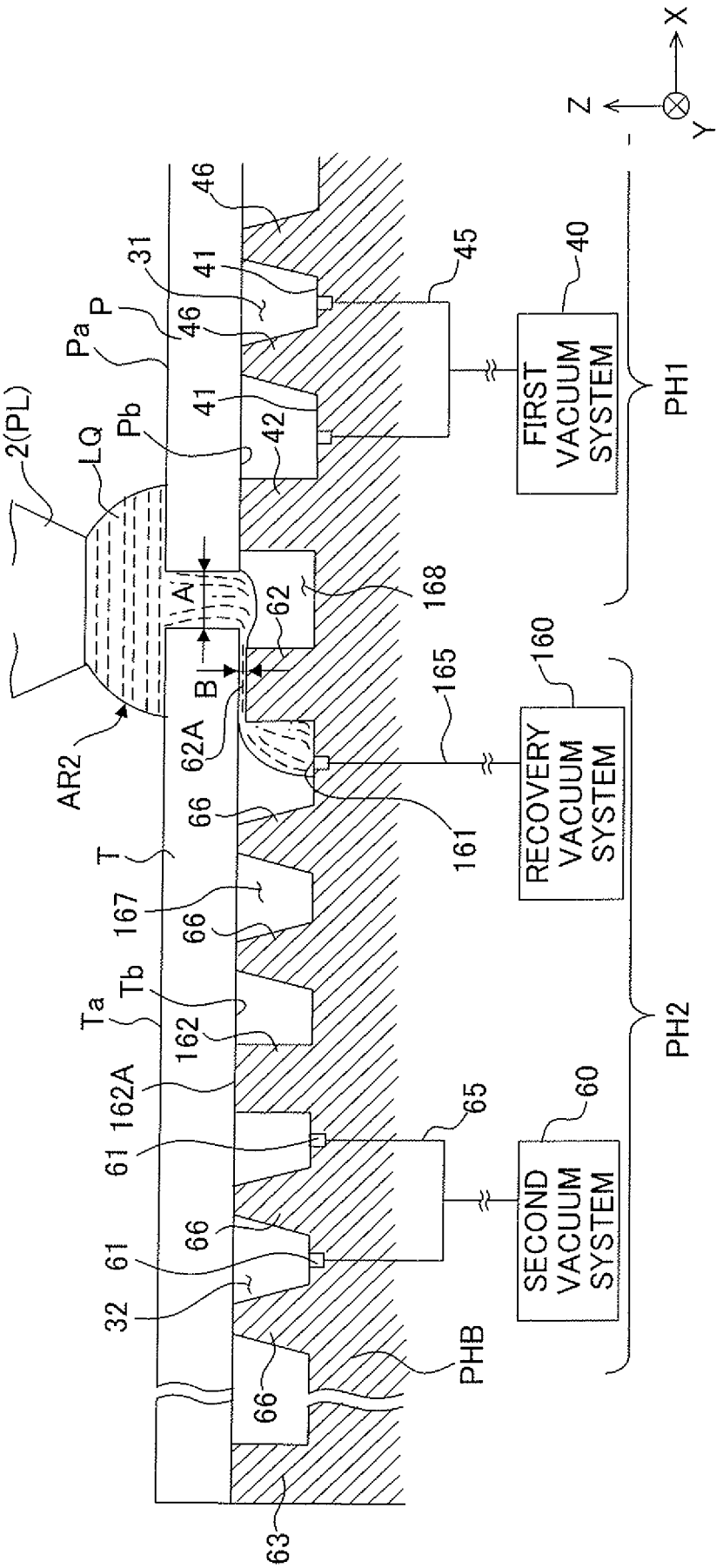

X
Z
Y
2(PL)
LQ
AR2
T
Ta
Tb
Pa
P
Pb
A
B
31
41
46
42
62
62A
168
165
161
66
167
162
162A
61
32
63
PHB
45
40
FIRST VACUUM SYSTEM
PH1
160
RECOVERY VACUUM SYSTEM
65
60
SECOND VACUUM SYSTEM
PH2

Fig. 11

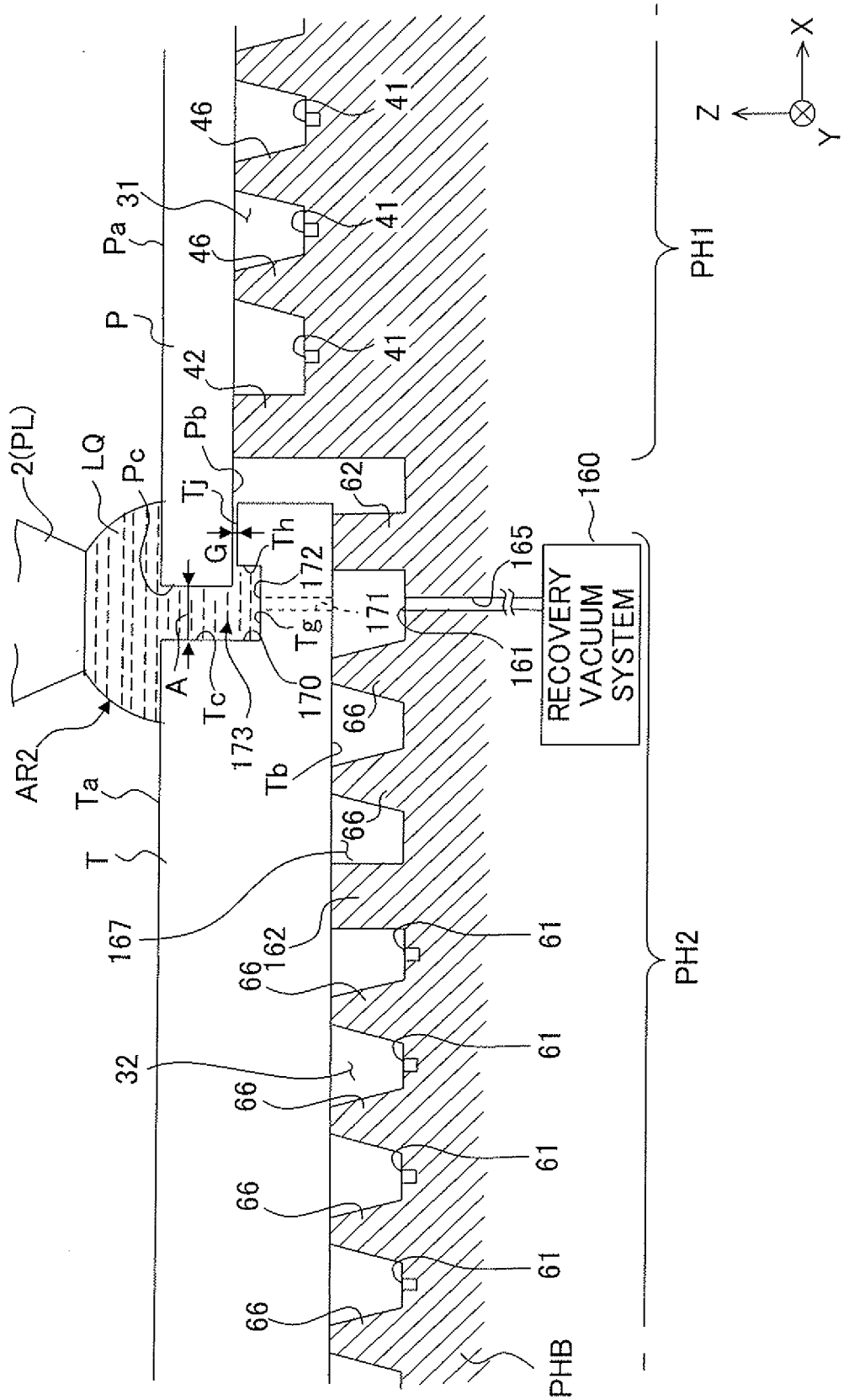

2(PL)
LQ
Pc
Pb
Tj
Th
G
A
Tc
Tg
Tb
Ta
T
AR2
P
Pa
31
46
41
42
62
160
165
161
171
172
173
170
66
167
162
32
61
PHB
PH1
PH2
RECOVERY VACUUM SYSTEM
Z
X
Y

Fig. 12

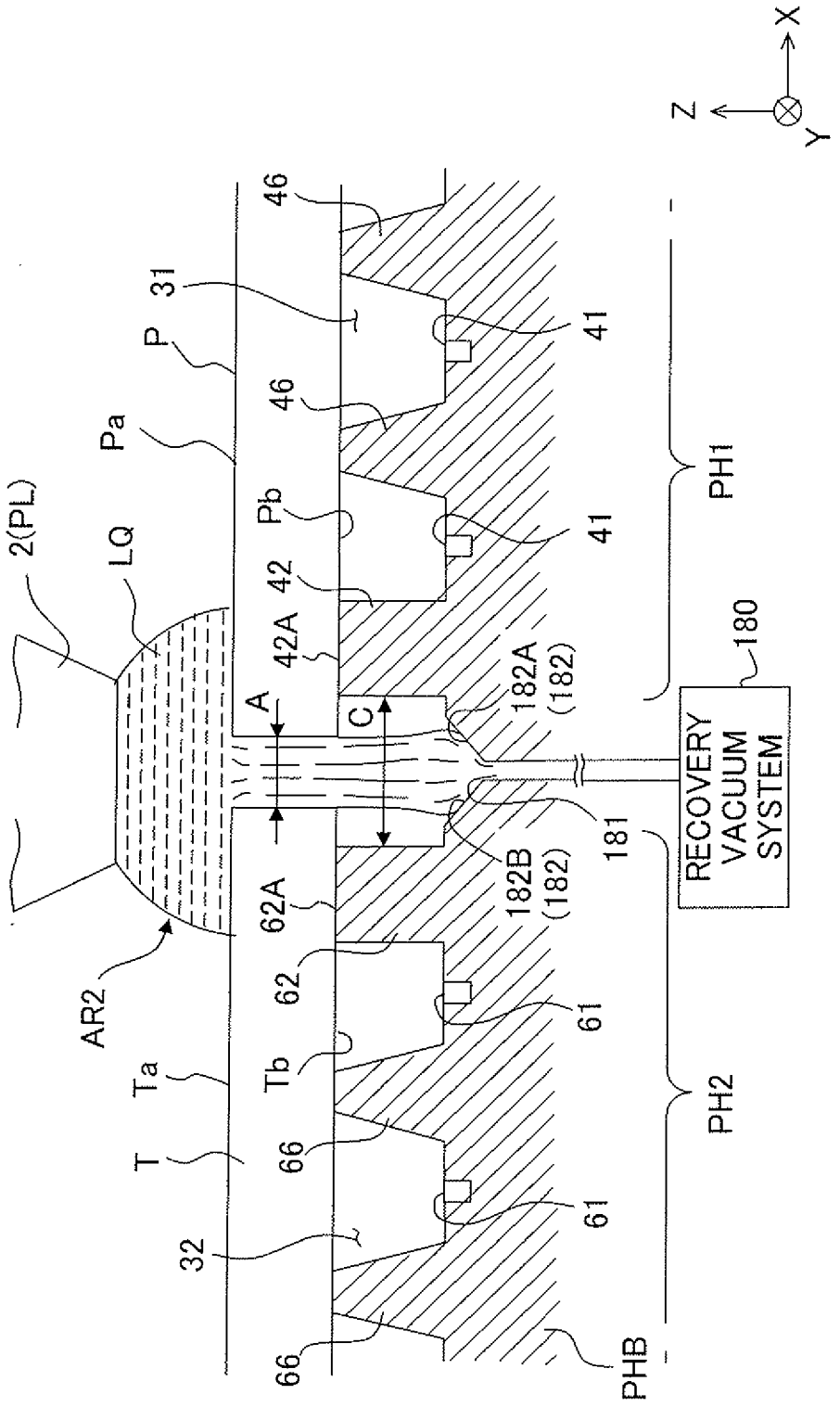

Z
X
Y
2(PL)
LQ
AR2
T
Ta
Tb
Pa
P
Pb
31
32
46
41
42
42A
A
C
62A
62
66
61
182A
(182)
182B
(182)
181
180
RECOVERY
VACUUM
SYSTEM
PH1
PH2
PHB

Fig. 13

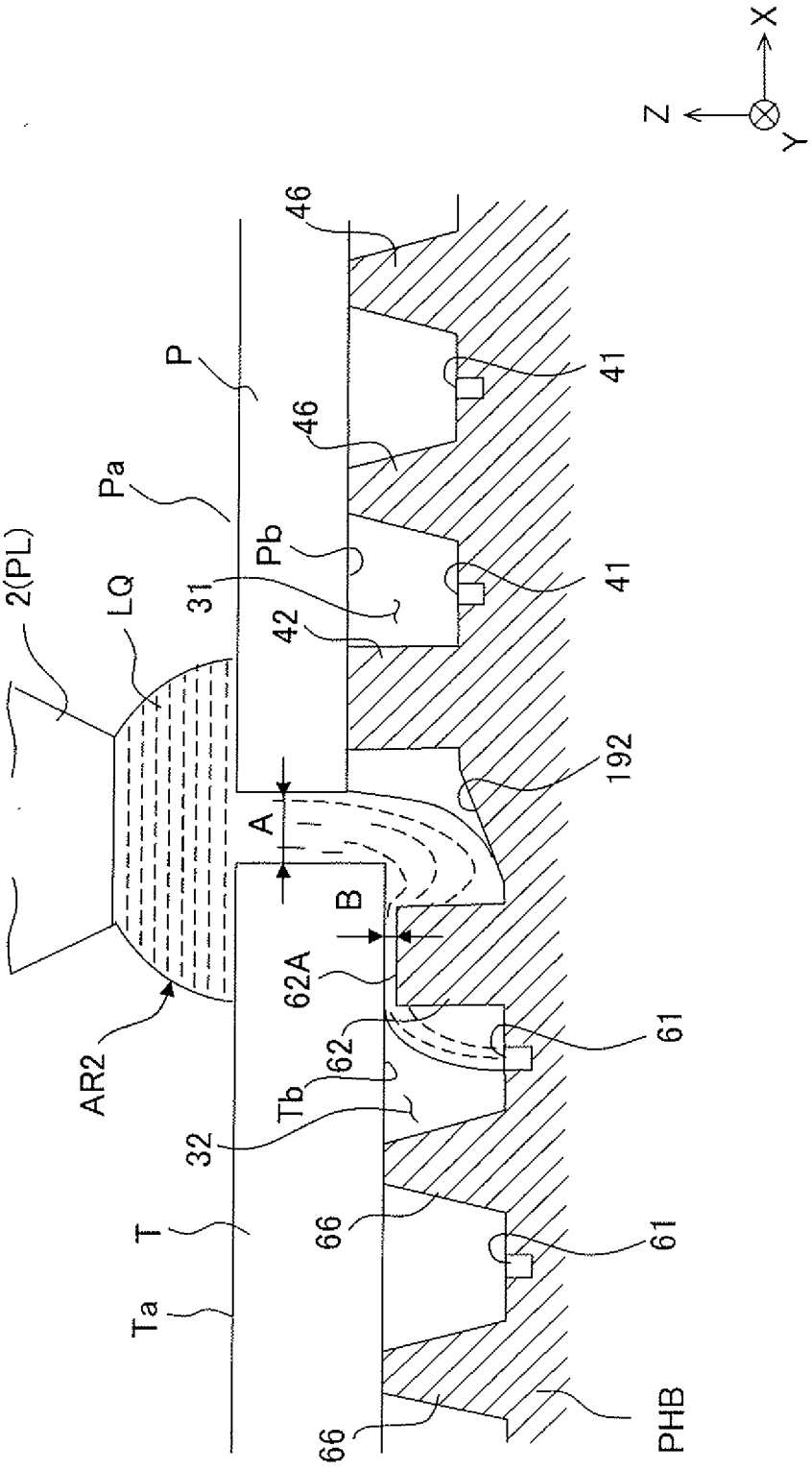

X
Z
Y
46
P
41
Pa
46
Pb
2(PL)
LQ
31
41
42
192
A
B
62A
61
AR2
62
Tb
32
66
61
T
Ta
66
PHB

Fig. 14

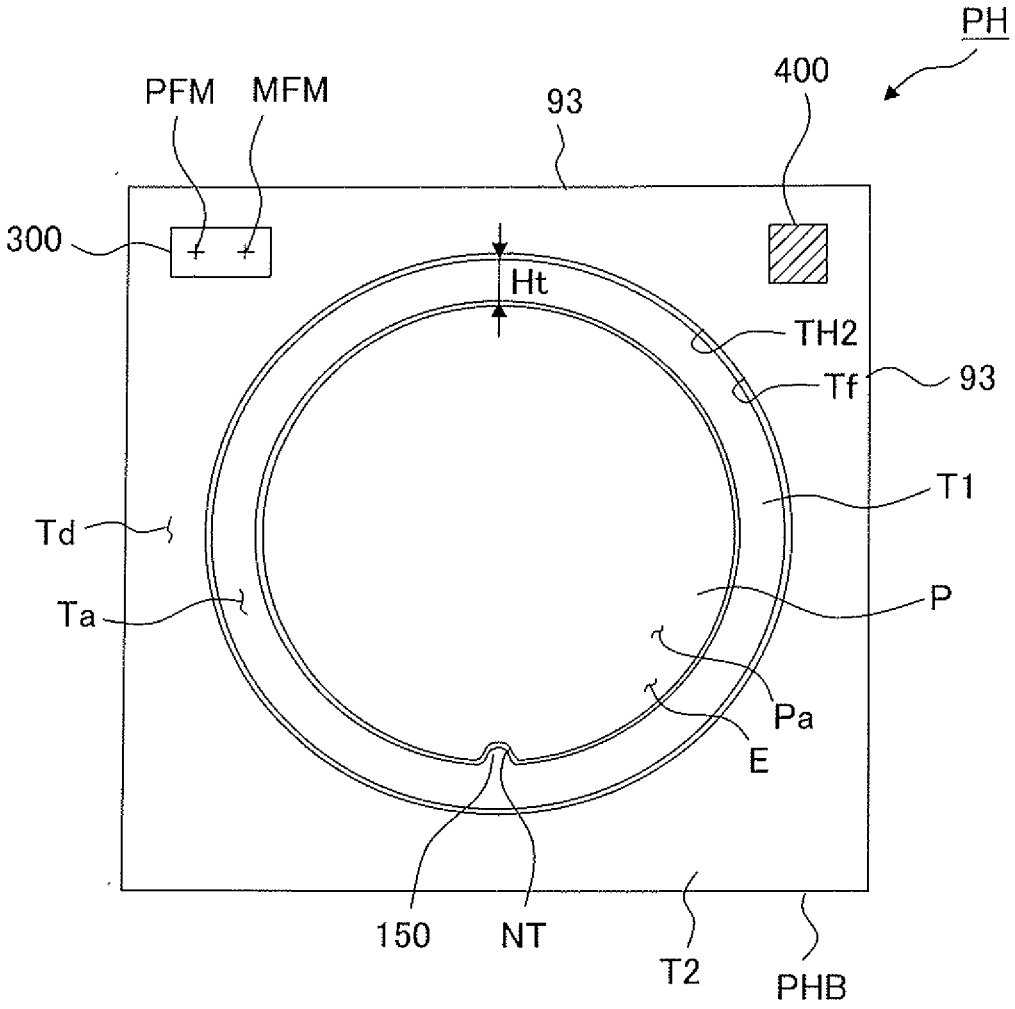


Fig. 15

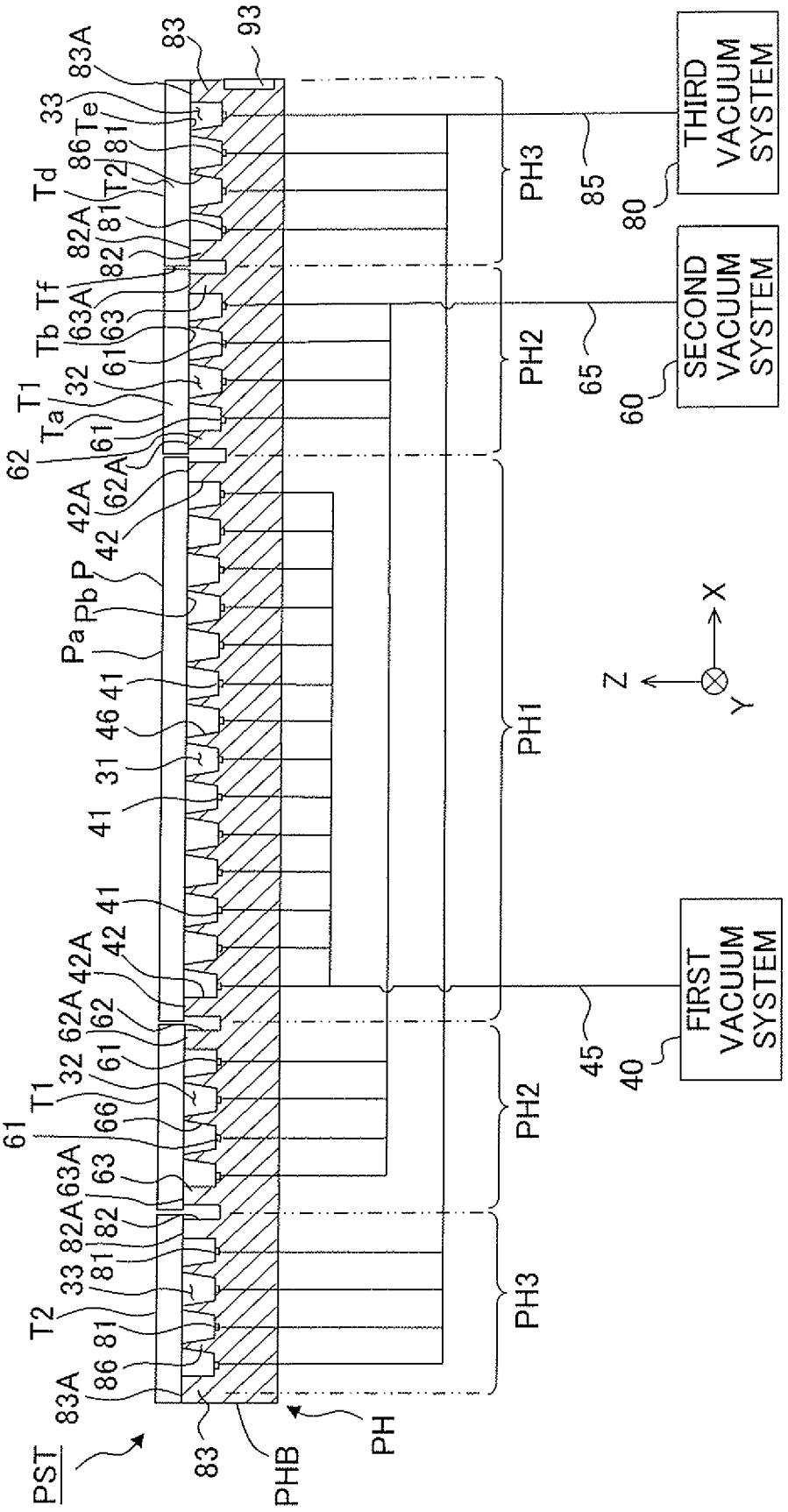

PST
83A
86
81
T2
33
82A
82
81
63A
63
61
T1
32
62A
62
61
66
63A
63
82A
82
81
33
T2
81
86
83A
83
PHB
PH
PH3
PH2
PH1
PH2
PH3
45
40
FIRST VACUUM SYSTEM
65
60
SECOND VACUUM SYSTEM
85
80
THIRD VACUUM SYSTEM
Z
X
Y

Fig. 16

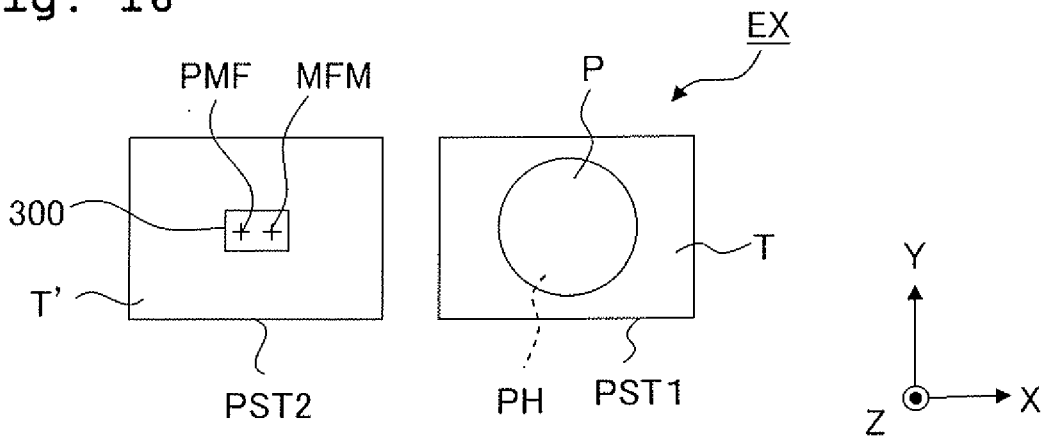
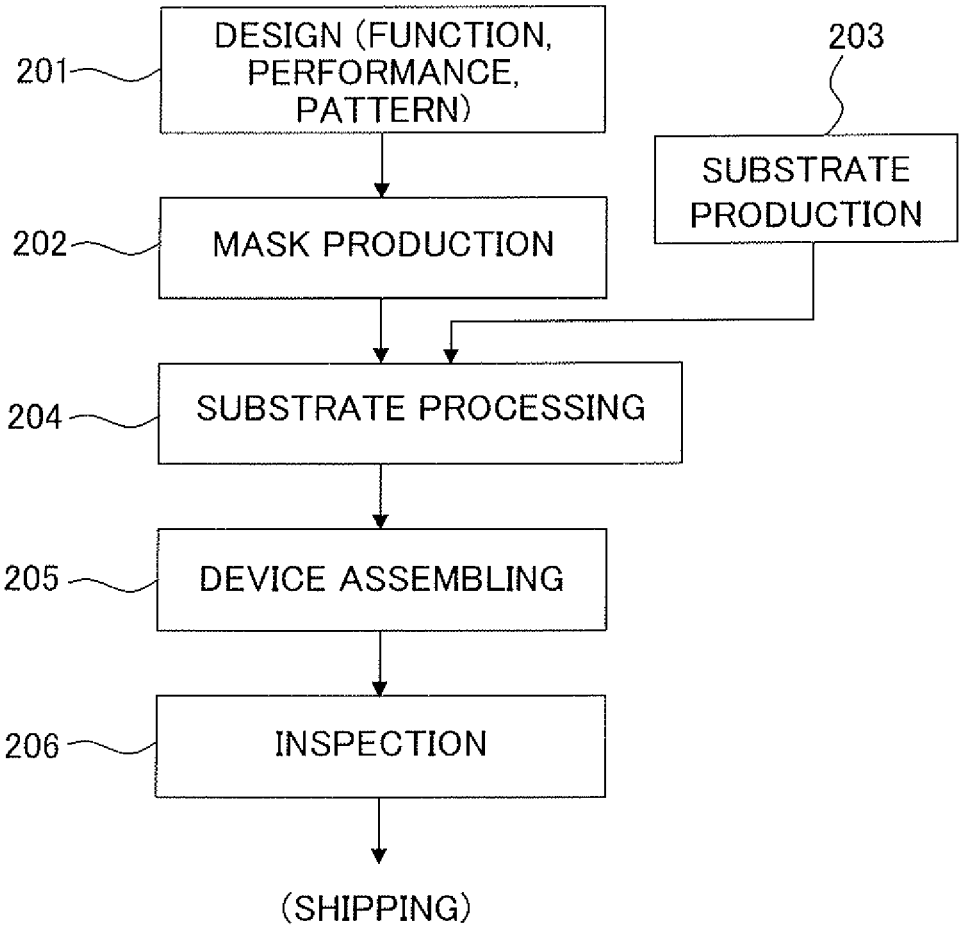

EX
PMF
MFM
P
300
T
T'
Y
PST2
PH
PST1
Z
X

Fig. 17


201
DESIGN (FUNCTION, PERFORMANCE, PATTERN)
203
SUBSTRATE PRODUCTION
202
MASK PRODUCTION
204
SUBSTRATE PROCESSING
205
DEVICE ASSEMBLING
206
INSPECTION
(SHIPPING)

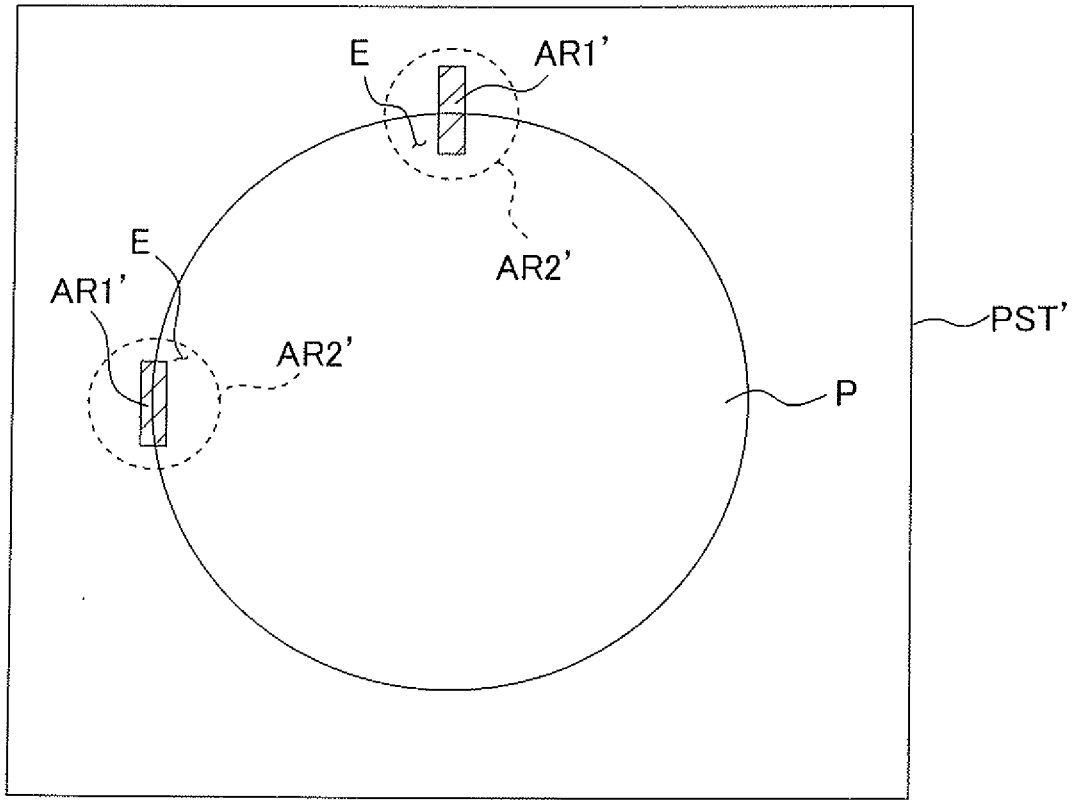



Fig. 18