FIG.1

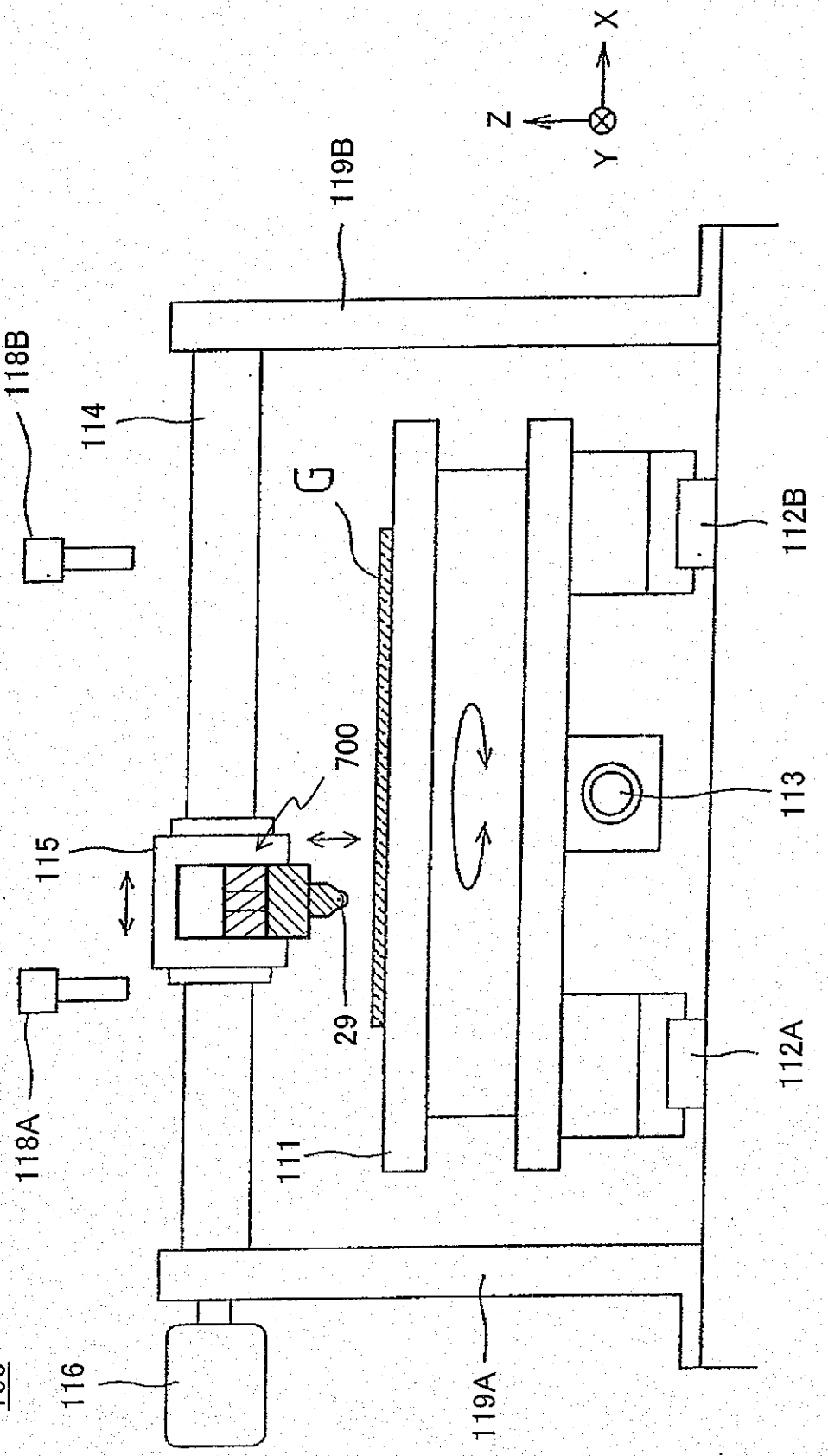

100
116
119A
111
118A
29
115
700
113
112A
112B
G
114
118B
119B
Z
X
Y

FIG.2

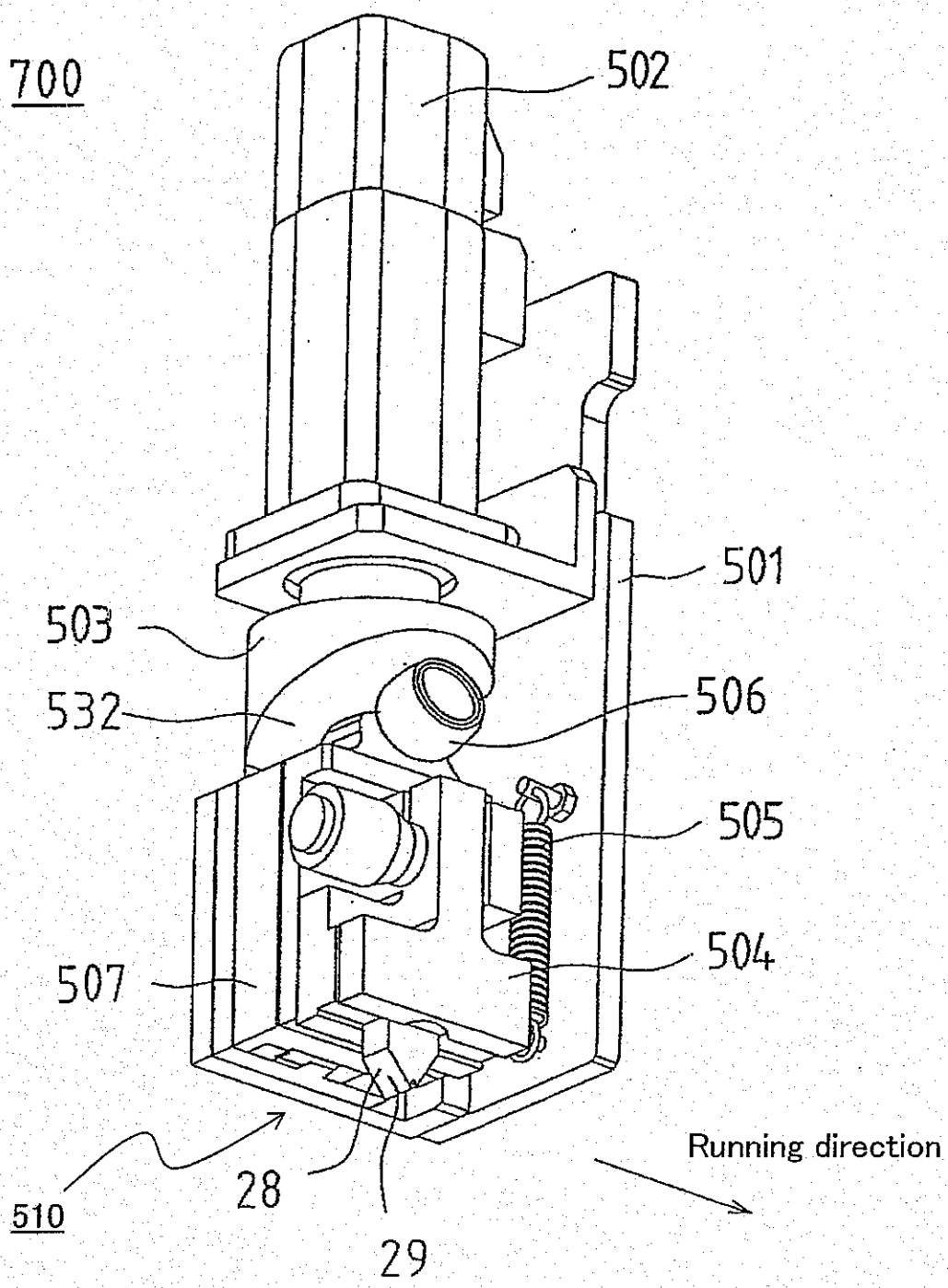

700
502
501
503
532
506
505
504
507
510
28
29
Running direction

FIG.3

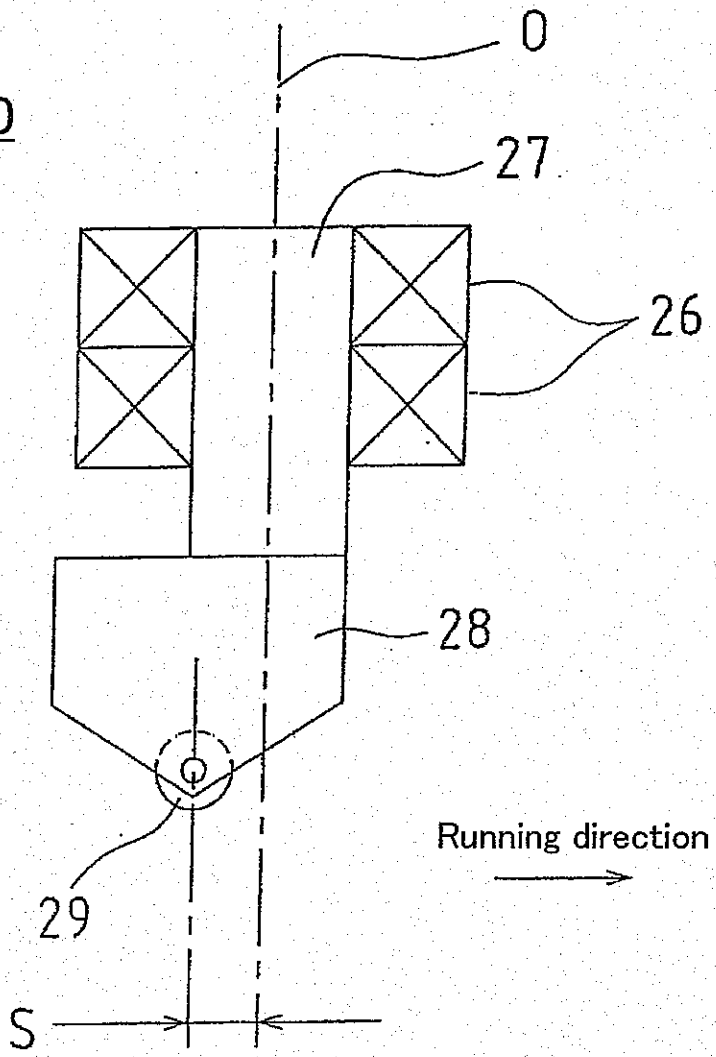


FIG.4

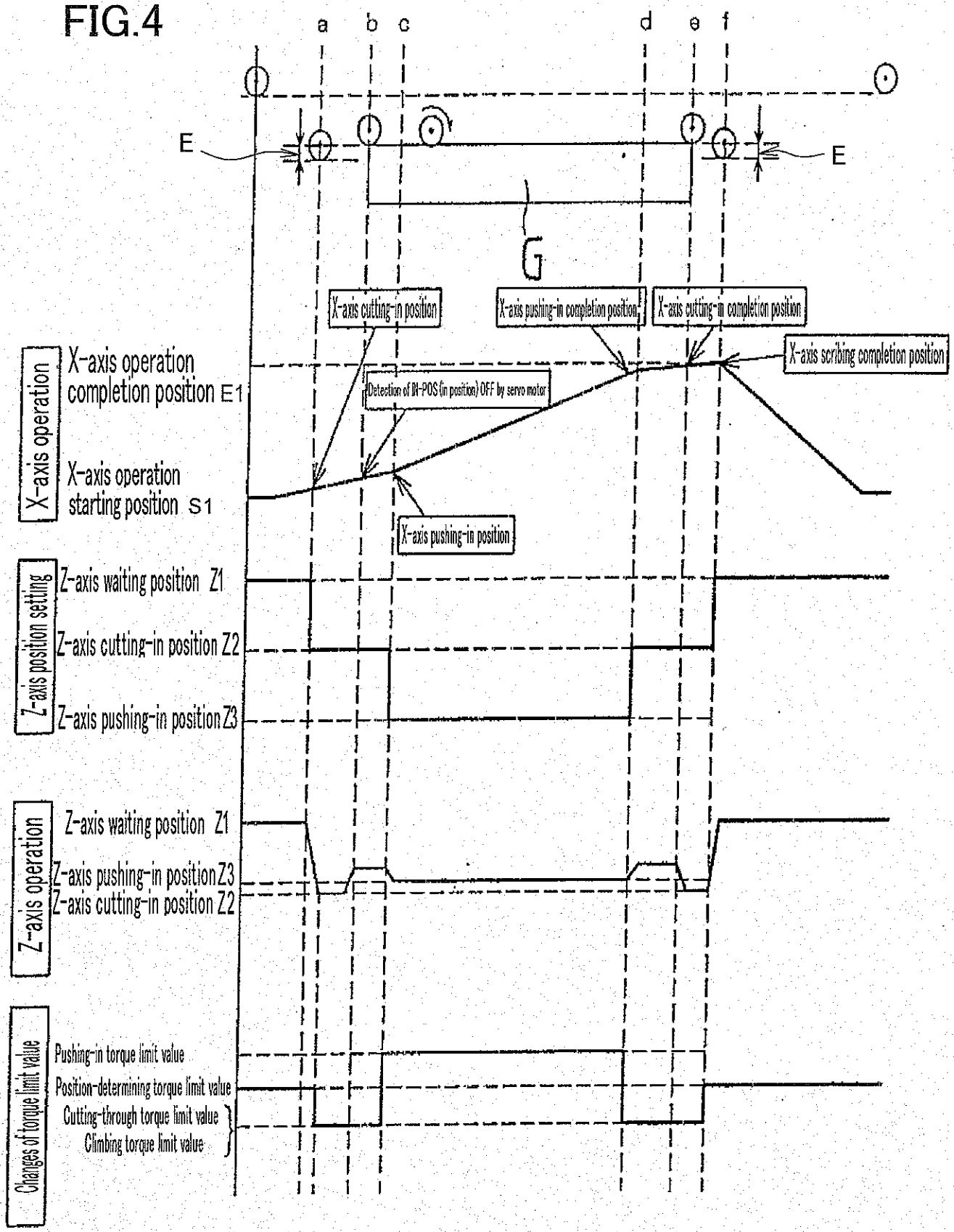
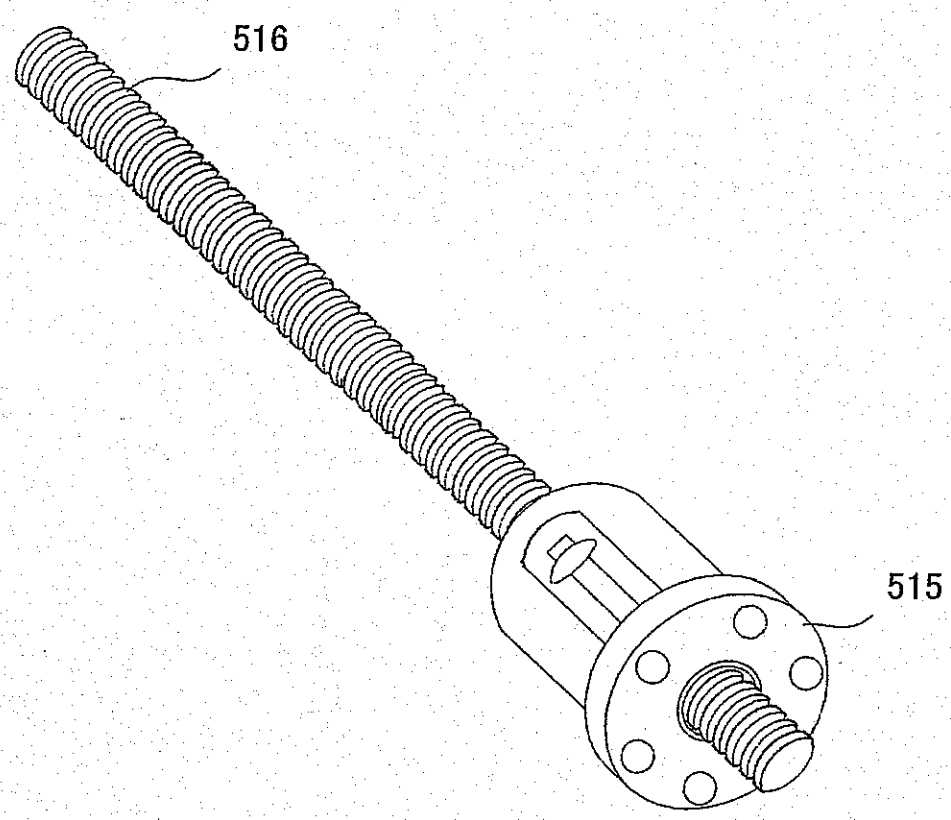

a
b
c
d
e
f
E
E
G
X-axis cutting-in position
X-axis pushing-in completion position
X-axis cutting-in completion position
X-axis scribing completion position
Detection of IN-POS (in position) OFF by servo motor
X-axis pushing-in position
X-axis operation
X-axis operation completion position E1
X-axis operation starting position S1
Z-axis position setting
Z-axis waiting position Z1
Z-axis cutting-in position Z2
Z-axis pushing-in position Z3
Z-axis operation
Z-axis waiting position Z1
Z-axis pushing-in position Z3
Z-axis cutting-in position Z2
Changes of torque limit value
Pushing-in torque limit value
Position-determining torque limit value
Cutting-through torque limit value
Climbing torque limit value

FIG.5



513

FIG.6

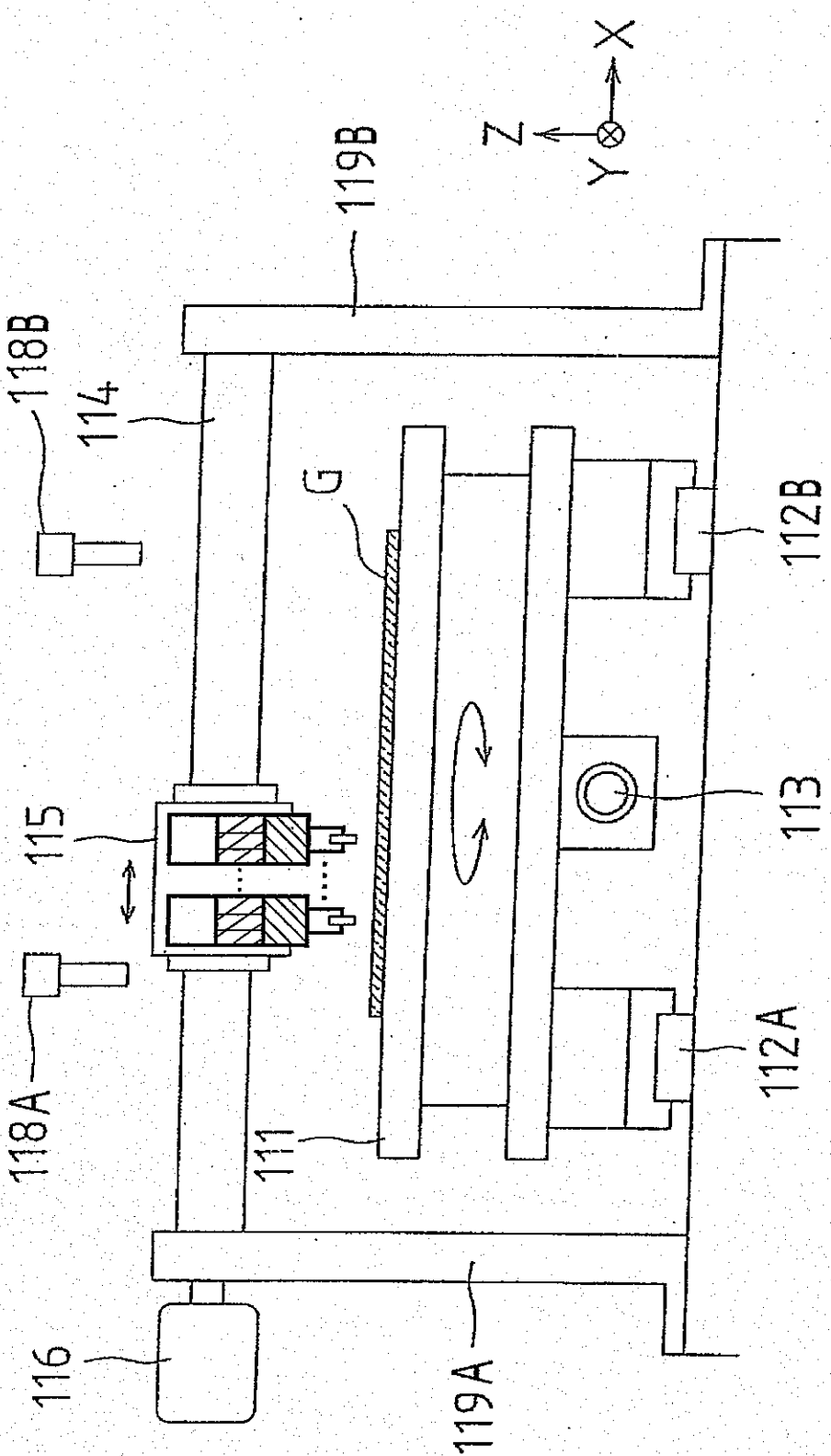


FIG.7

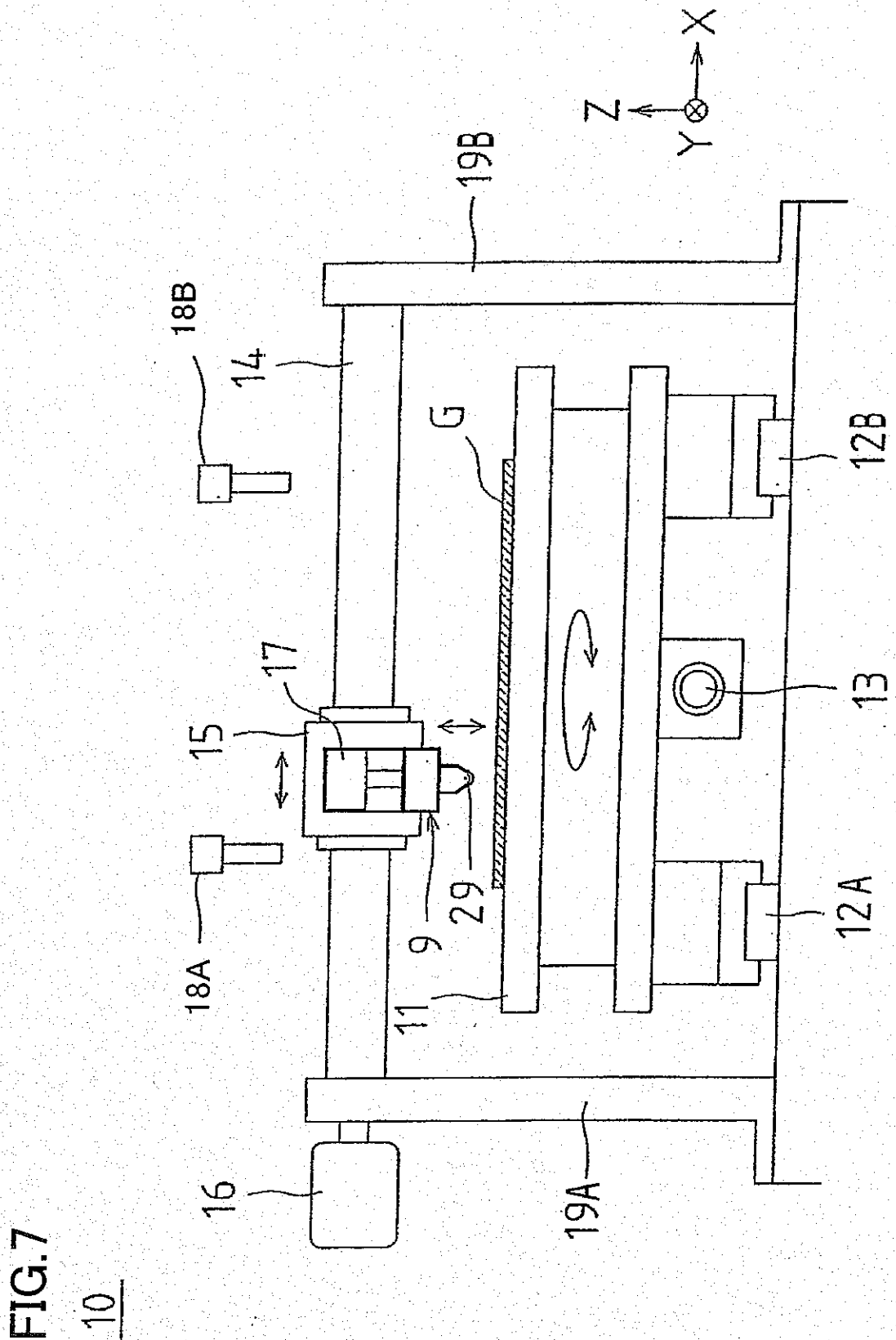


FIG.8

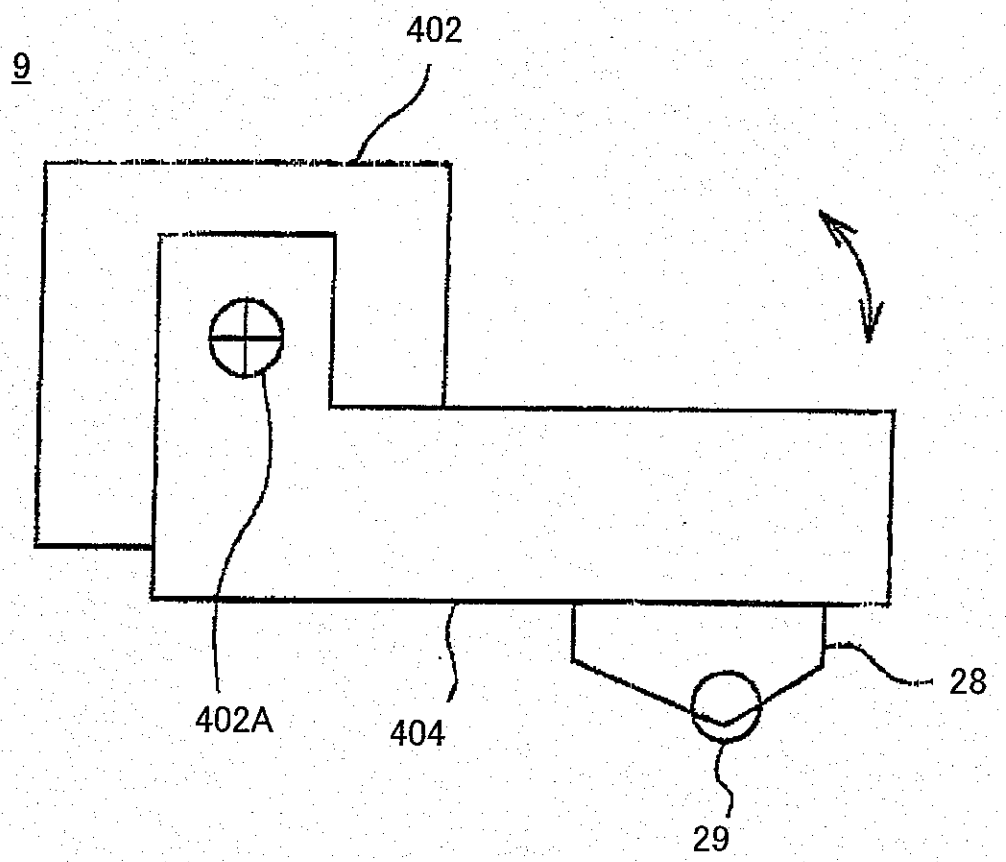
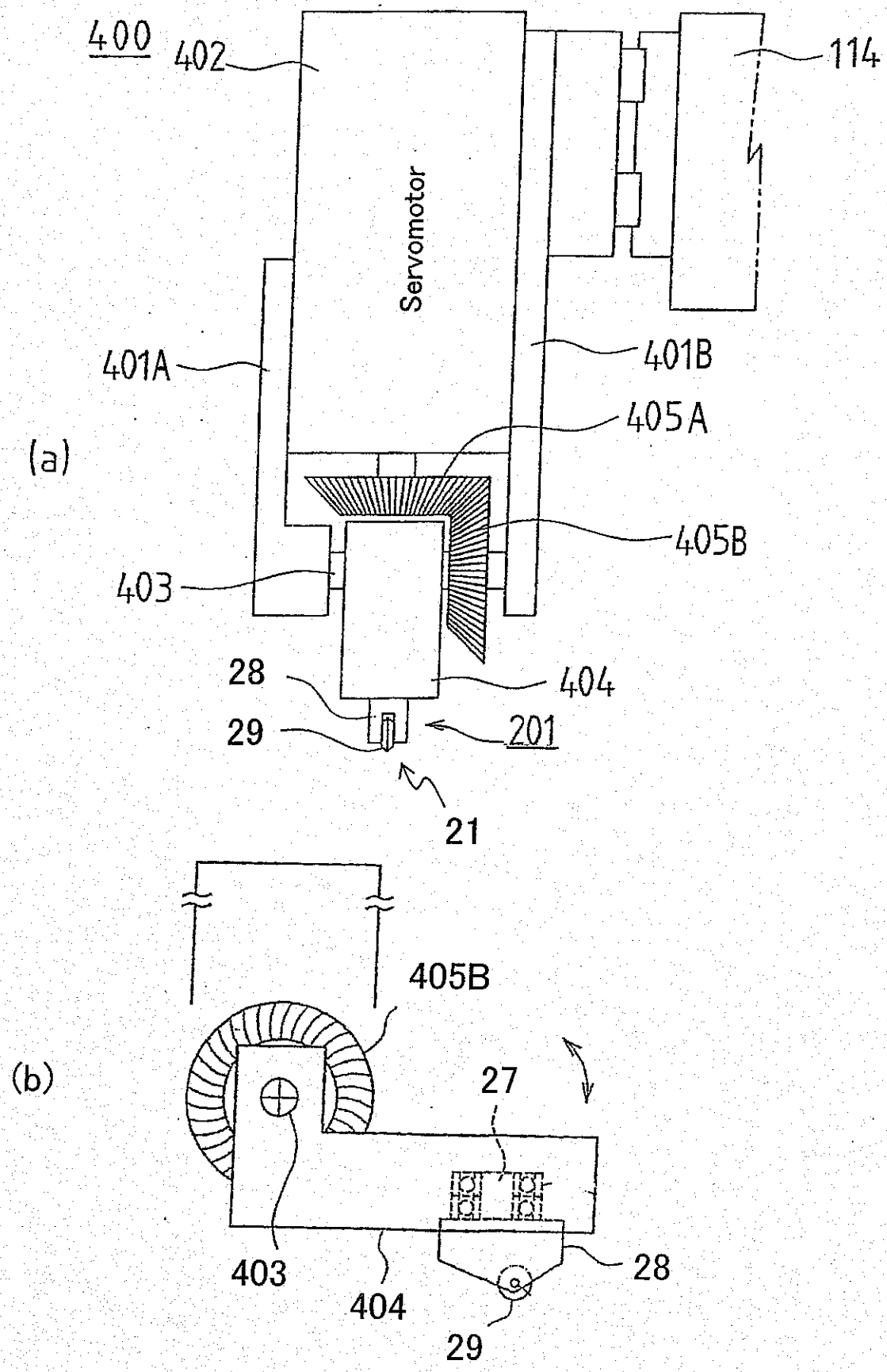


FIG.9


400
402
114
Servomotor
401A
401B
405A
(a)
405B
403
28
404
29
201
21
405B
(b)
27
403
404
28
29