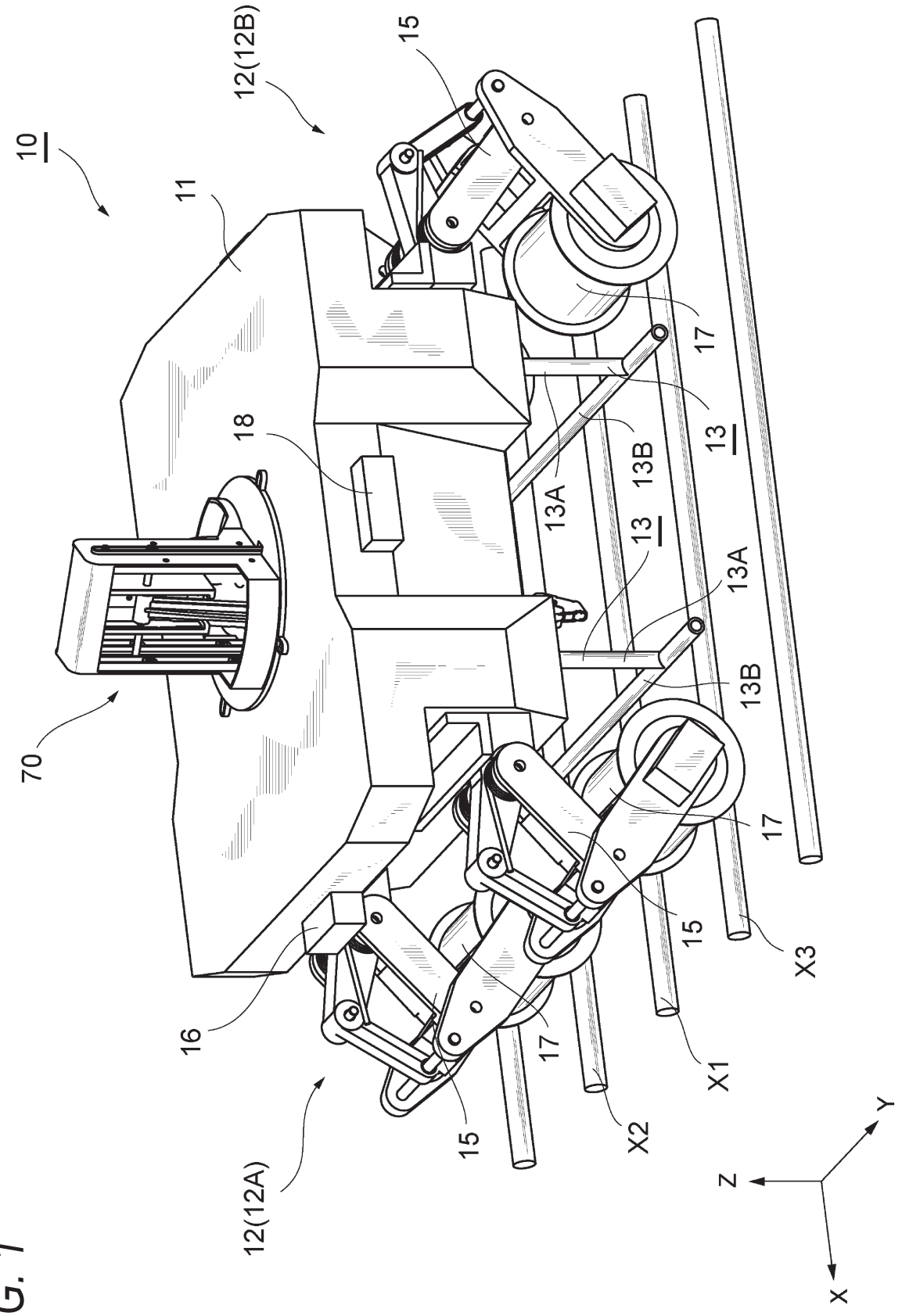
FIG. 1



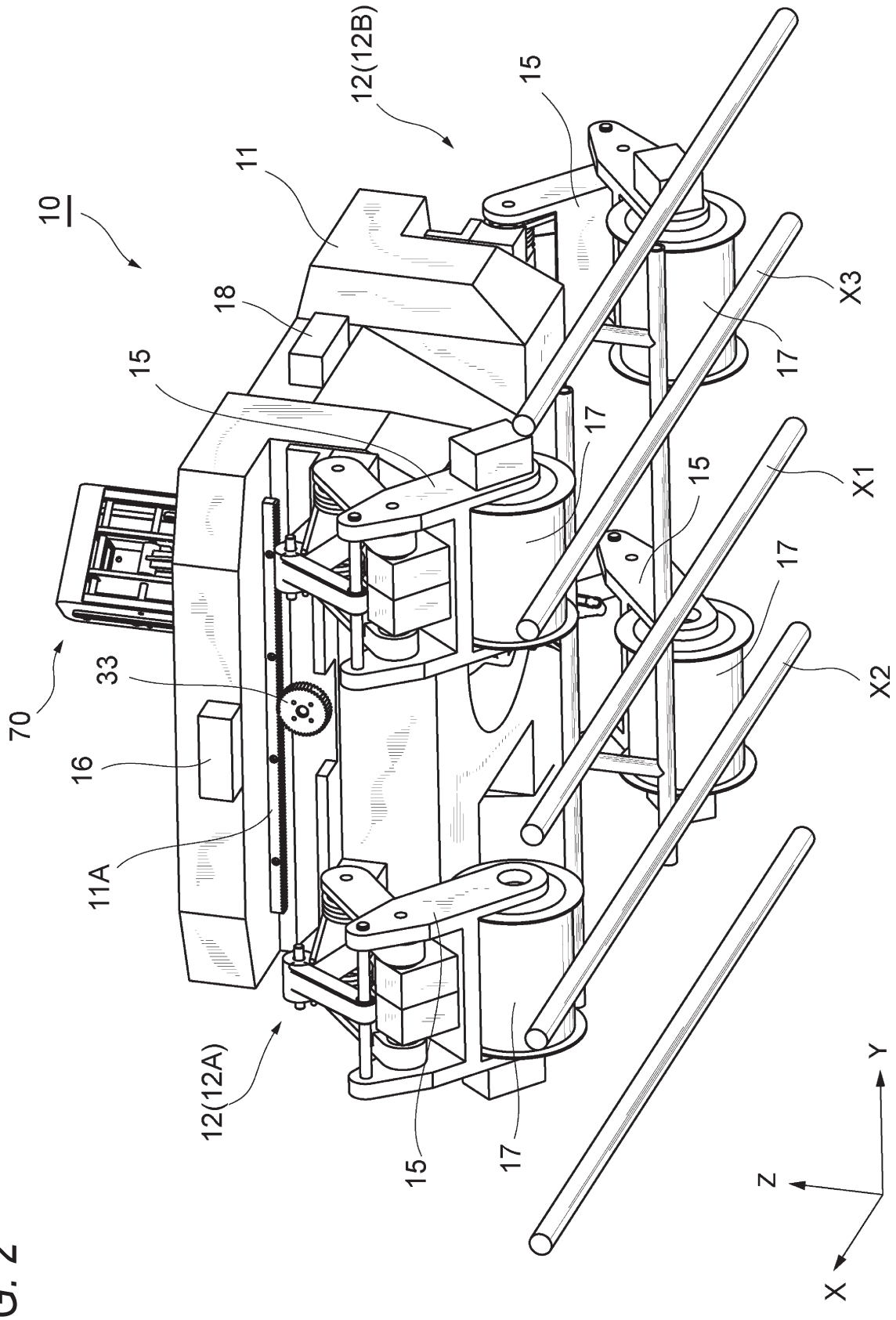

10
11
12(12B)
15
18
15
17
X3
17
15
X1
17
X2
70
33
16
11A
12(12A)
15
17
Y
Z
X

FIG. 2

FIG. 3

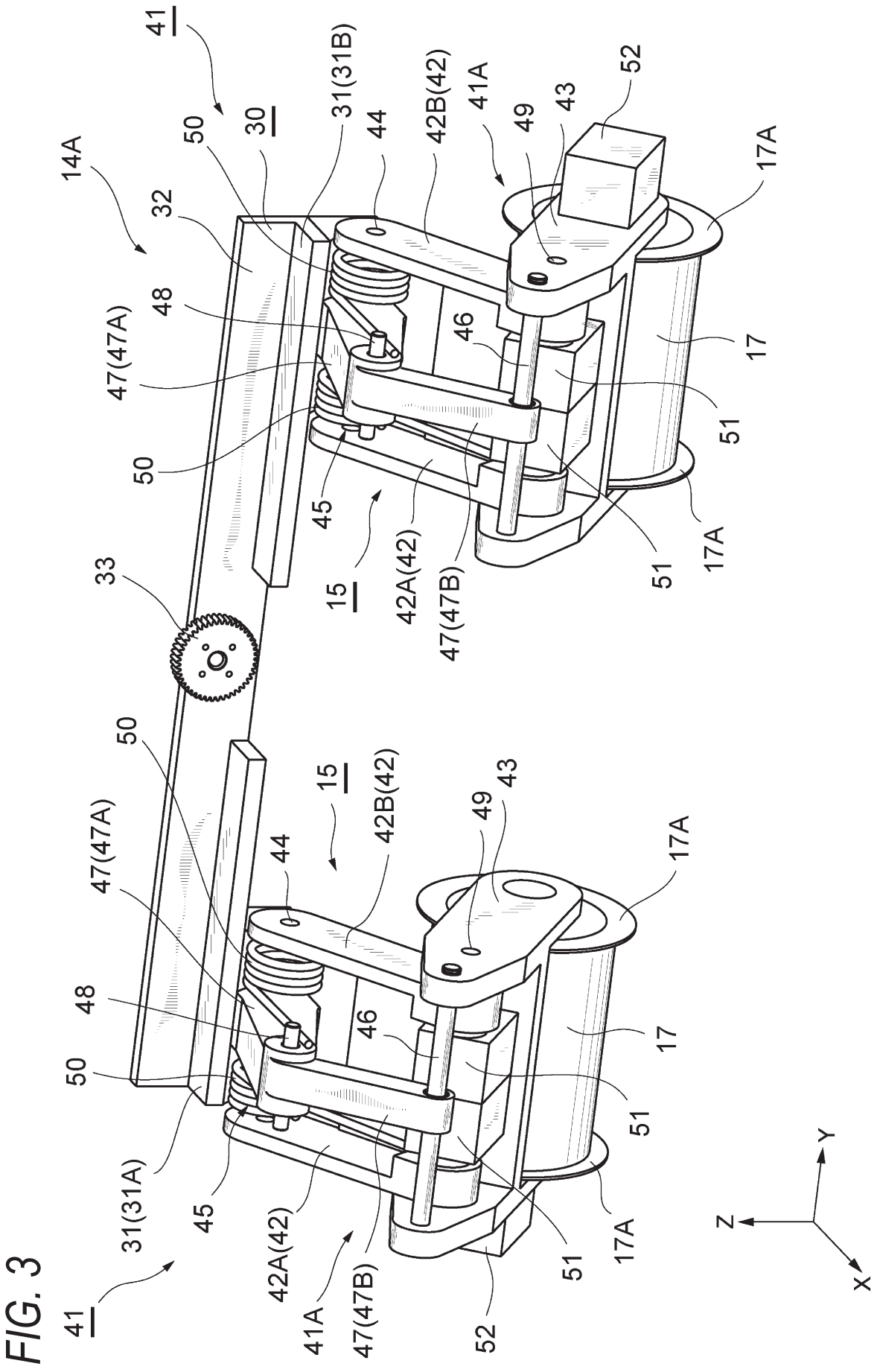

41
14A
32
30
31(31B)
44
42B(42)
41A
49
43
52
17A
50
48
47(47A)
46
17
51
45
15
42A(42)
47(47B)
33
31(31A)
41A
52
Y
Z
X

FIG. 4

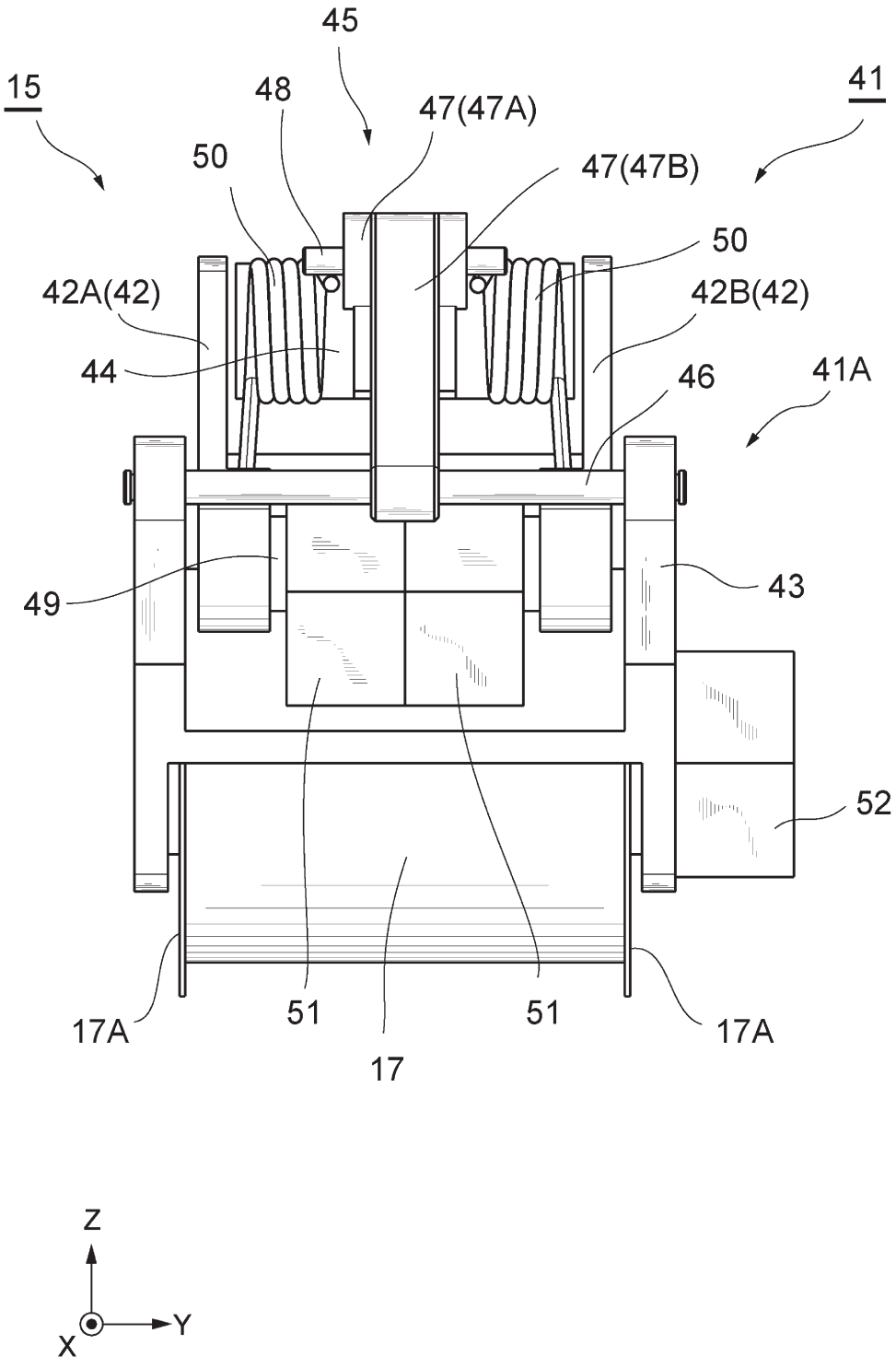

45
15
48
47(47A)
41
50
47(47B)
50
42A(42)
42B(42)
44
46
41A
49
43
52
17A
51
51
17A
17
Z
Y
X

FIG. 5

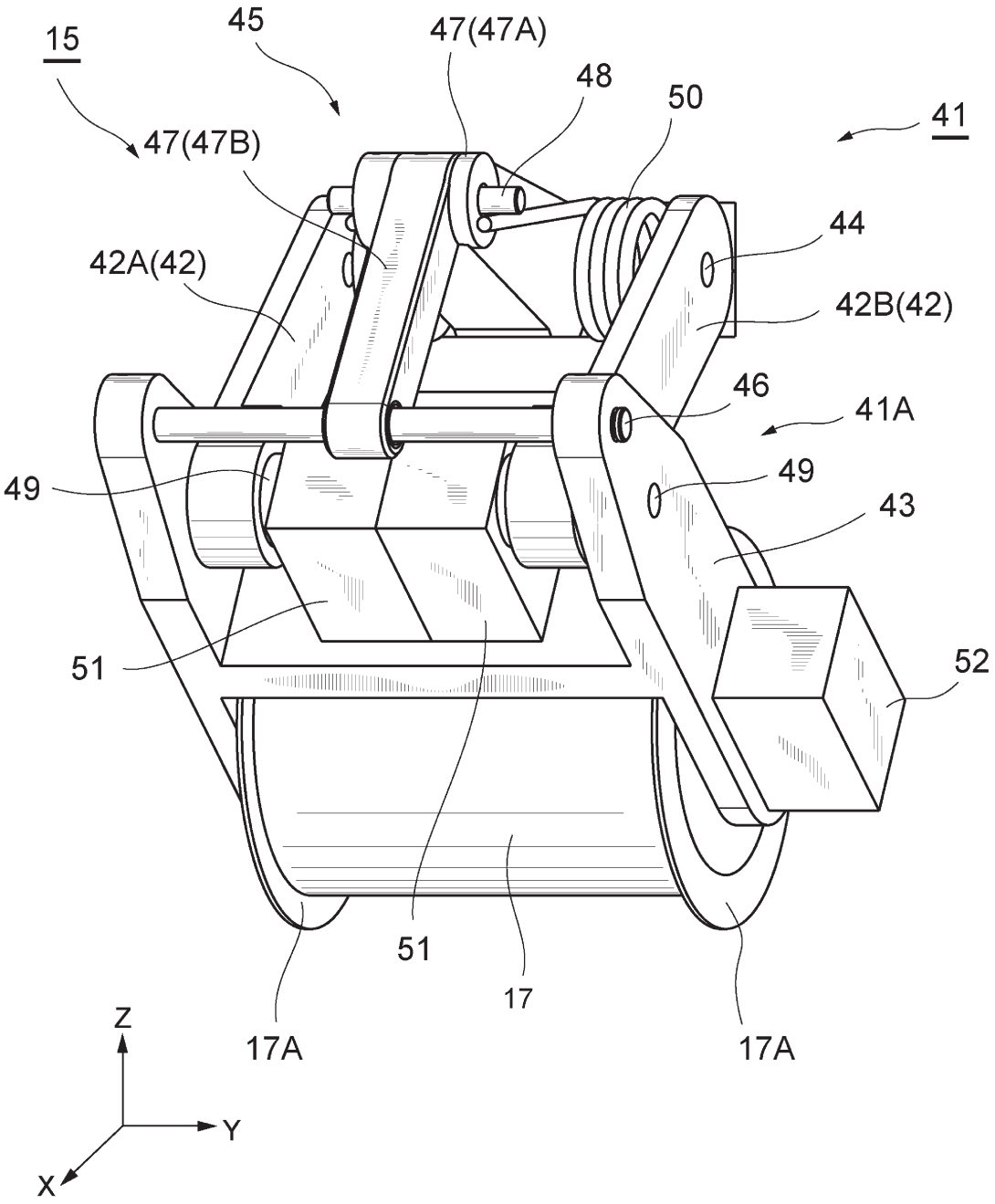

15
45
47(47A)
48
50
41
47(47B)
44
42A(42)
42B(42)
46
41A
49
49
43
51
52
51
17
17A
17A
Z
Y
X

FIG. 6

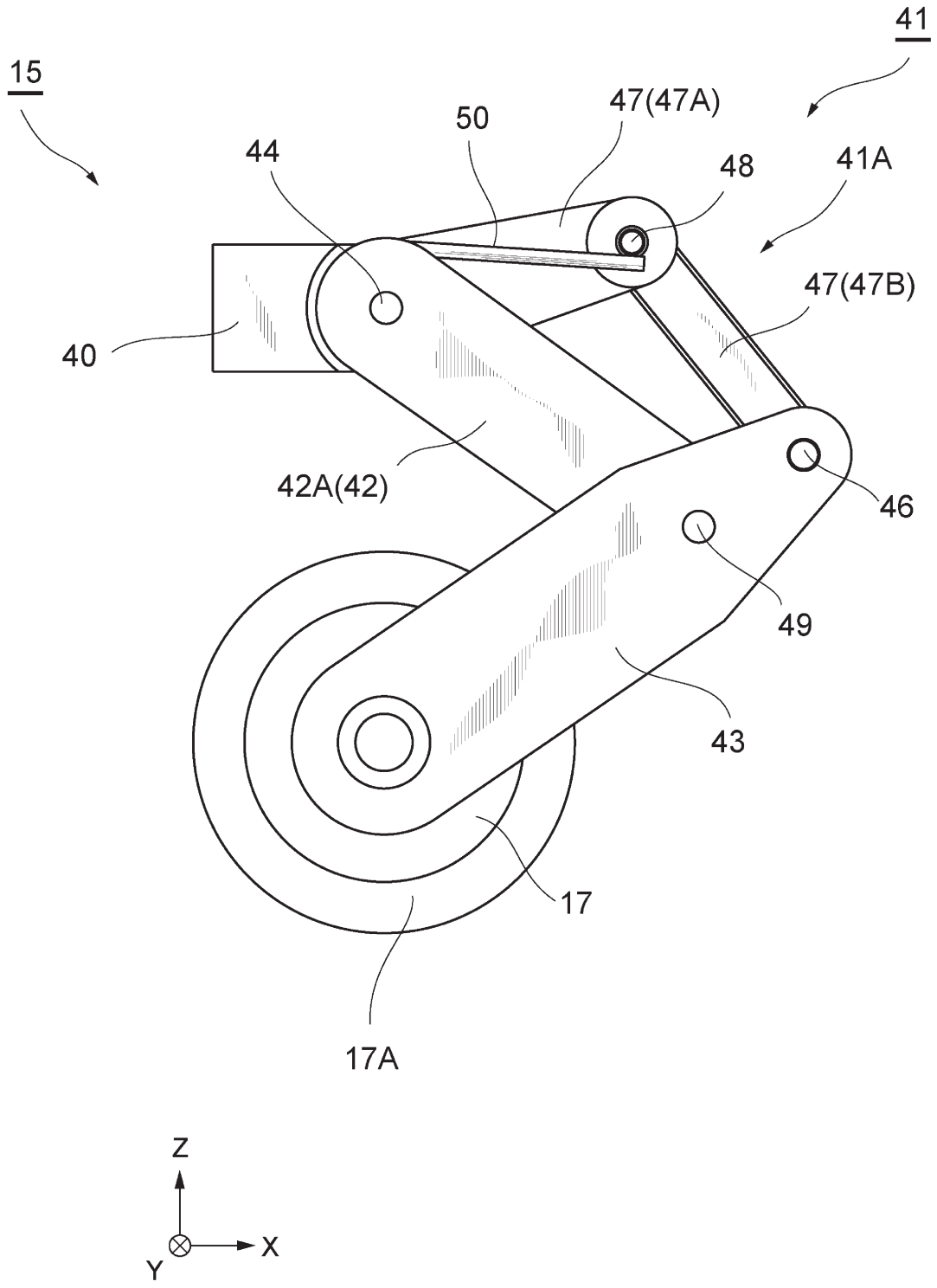


FIG. 7

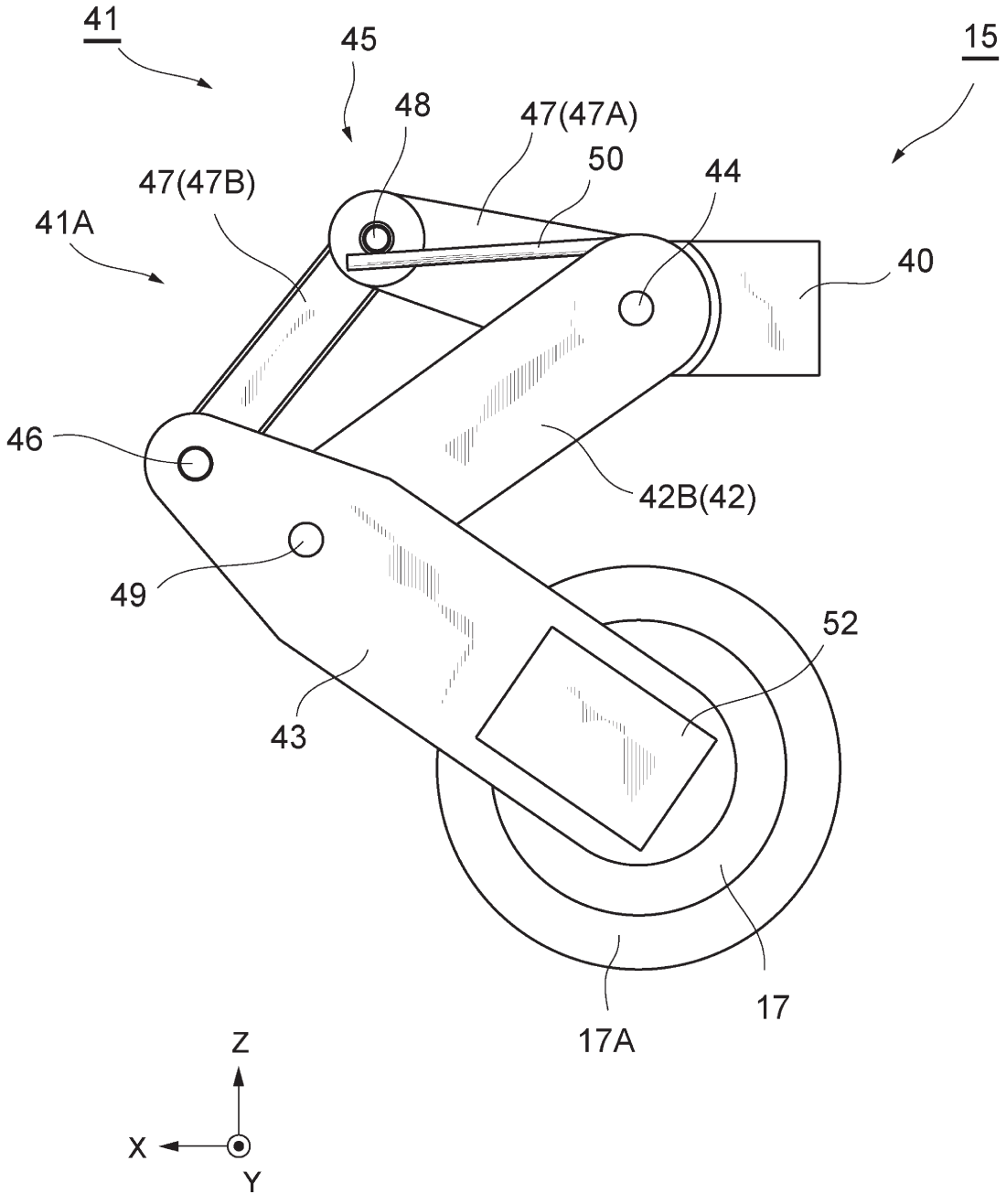


FIG. 8

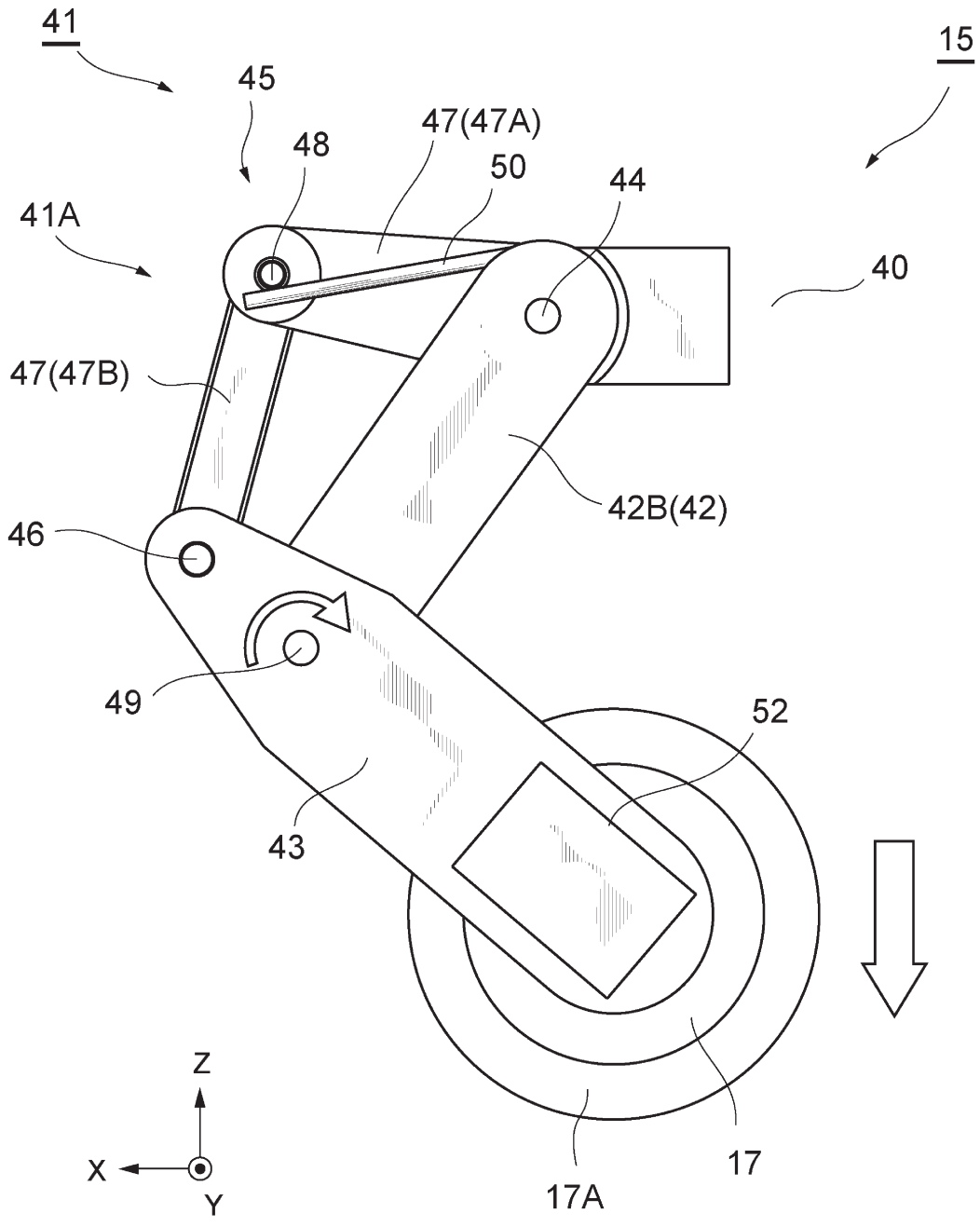


FIG. 9

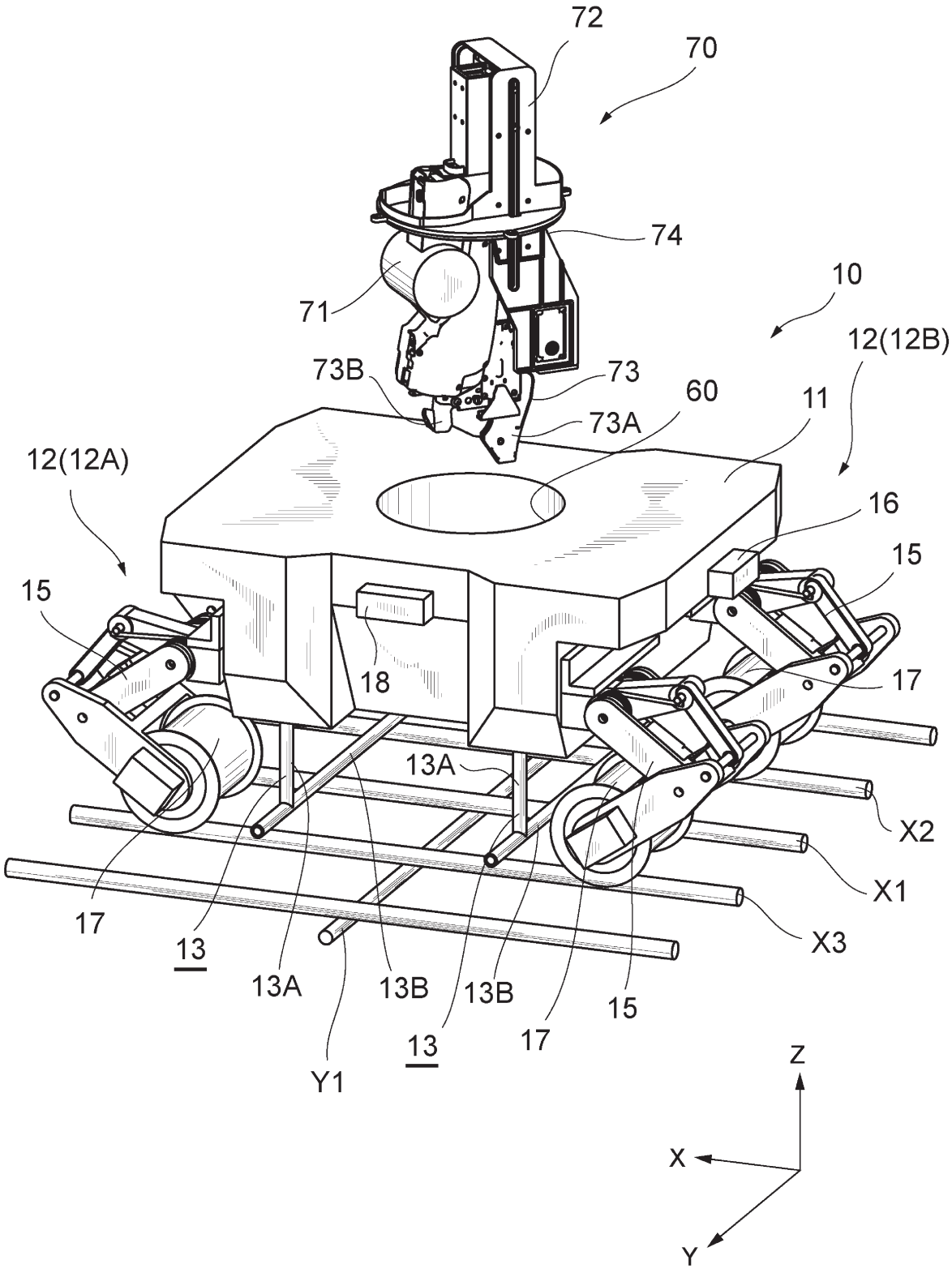
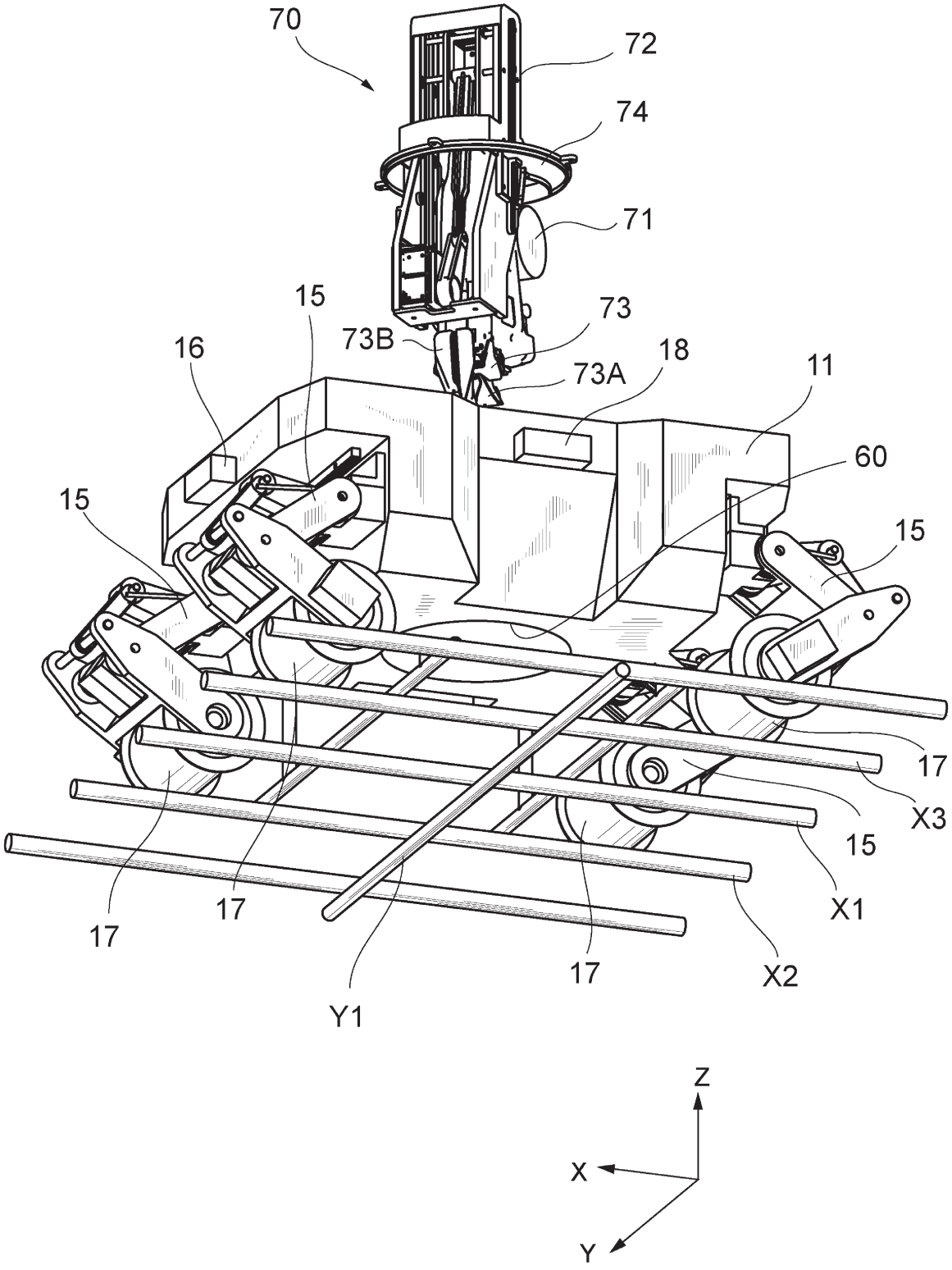

72
70
74
71
10
12(12B)
73B
73
60
11
73A
12(12A)
16
15
15
18
17
13A
X2
X1
17
X3
13
13A
13B
13B
15
17
13
Y1
Z
X
Y

FIG. 10


70
72
74
71
15
73
73B
16
18
73A
11
60
15
15
17
X3
15
X1
17
17
17
X2
Y1
Z
X
Y

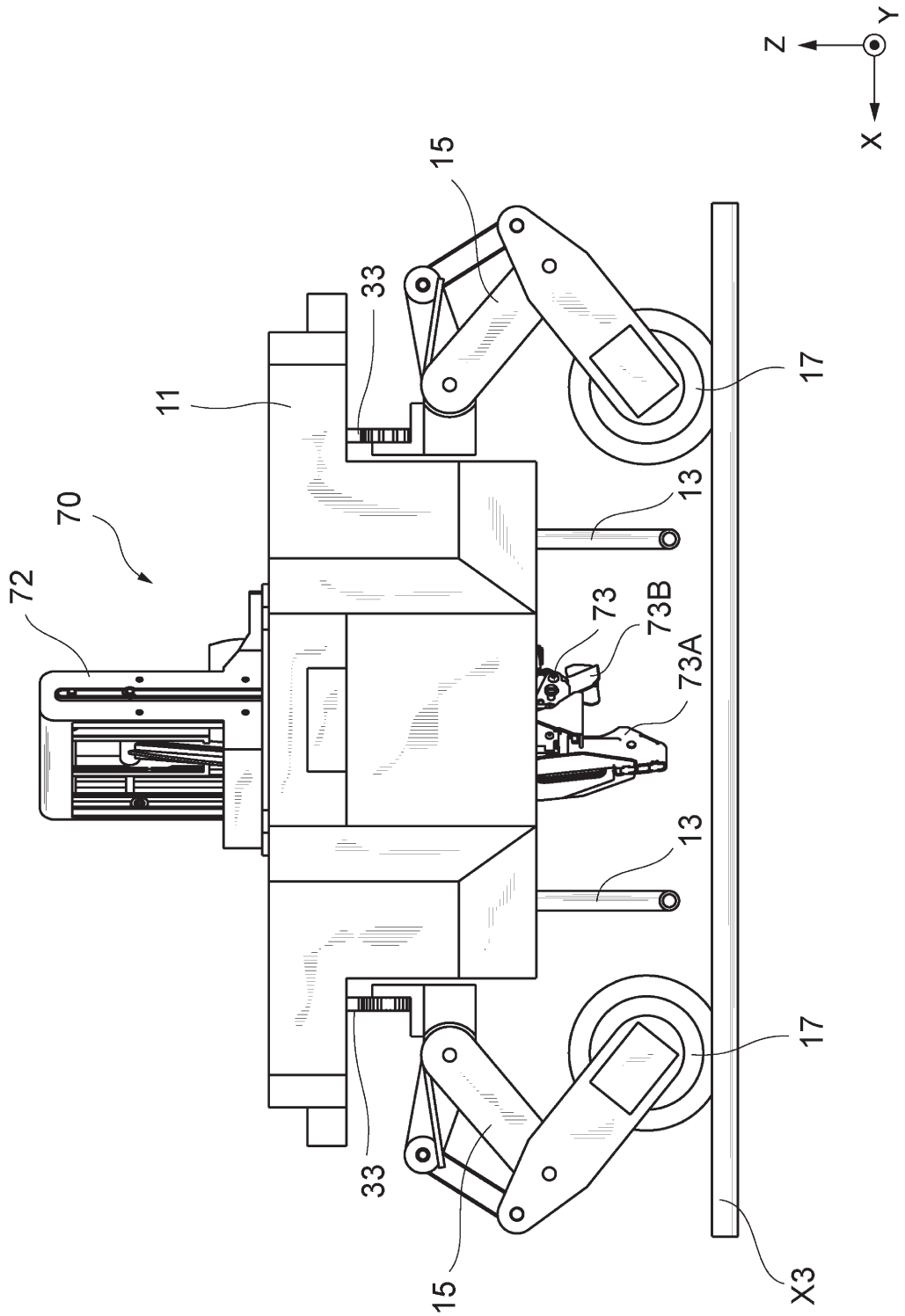


FIG. 11A

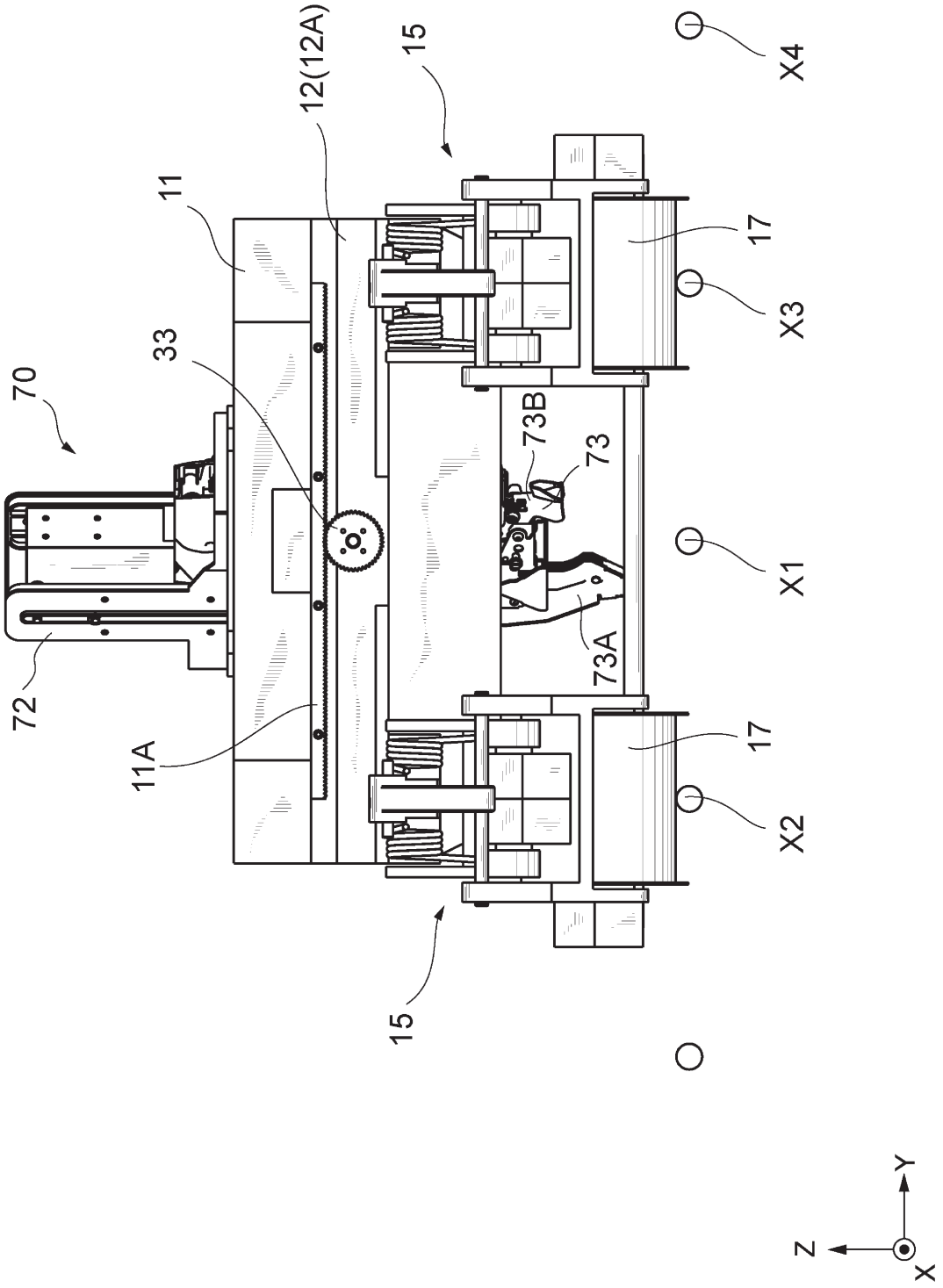


FIG. 11B

FIG. 11C

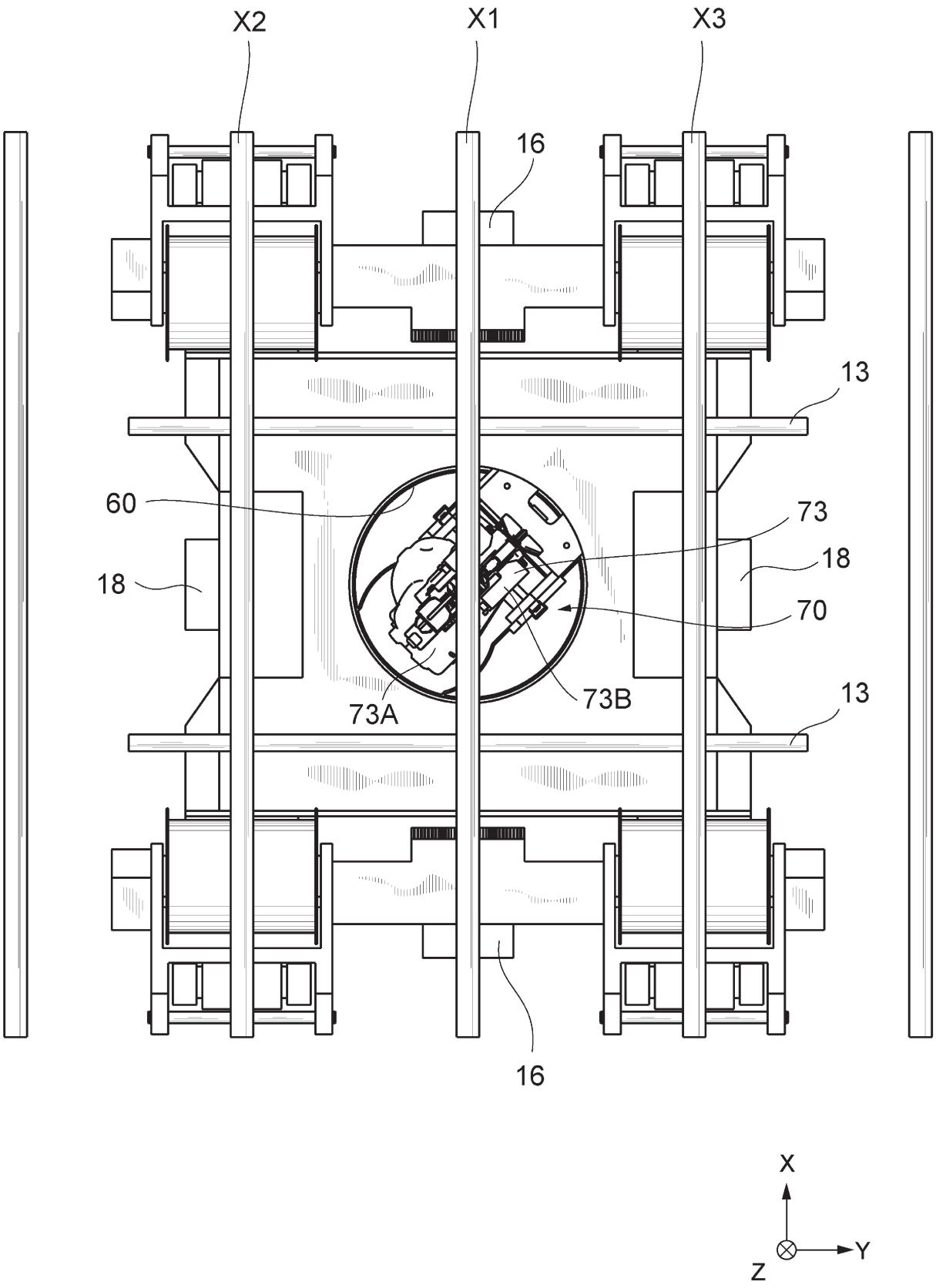
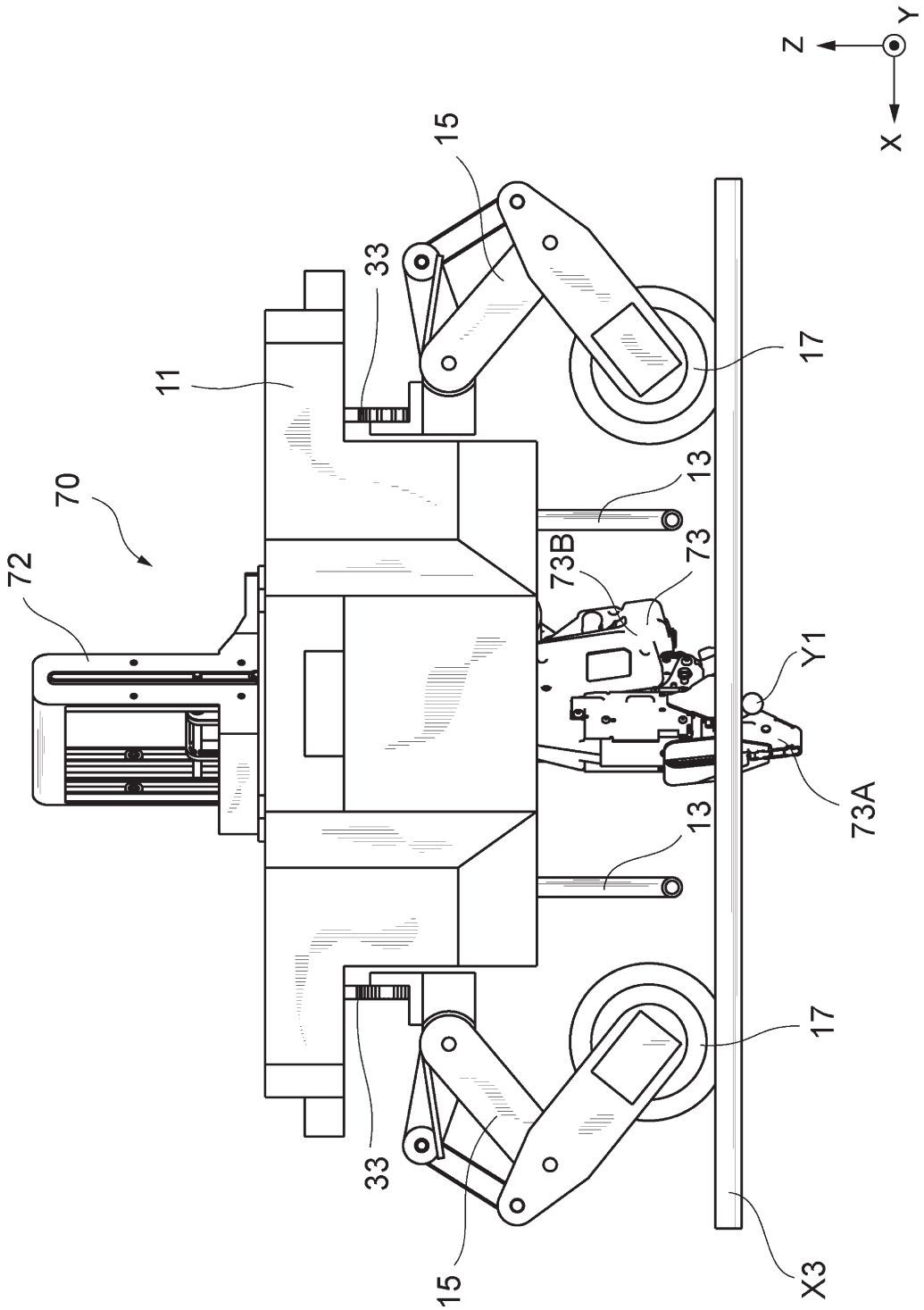


FIG. 12A



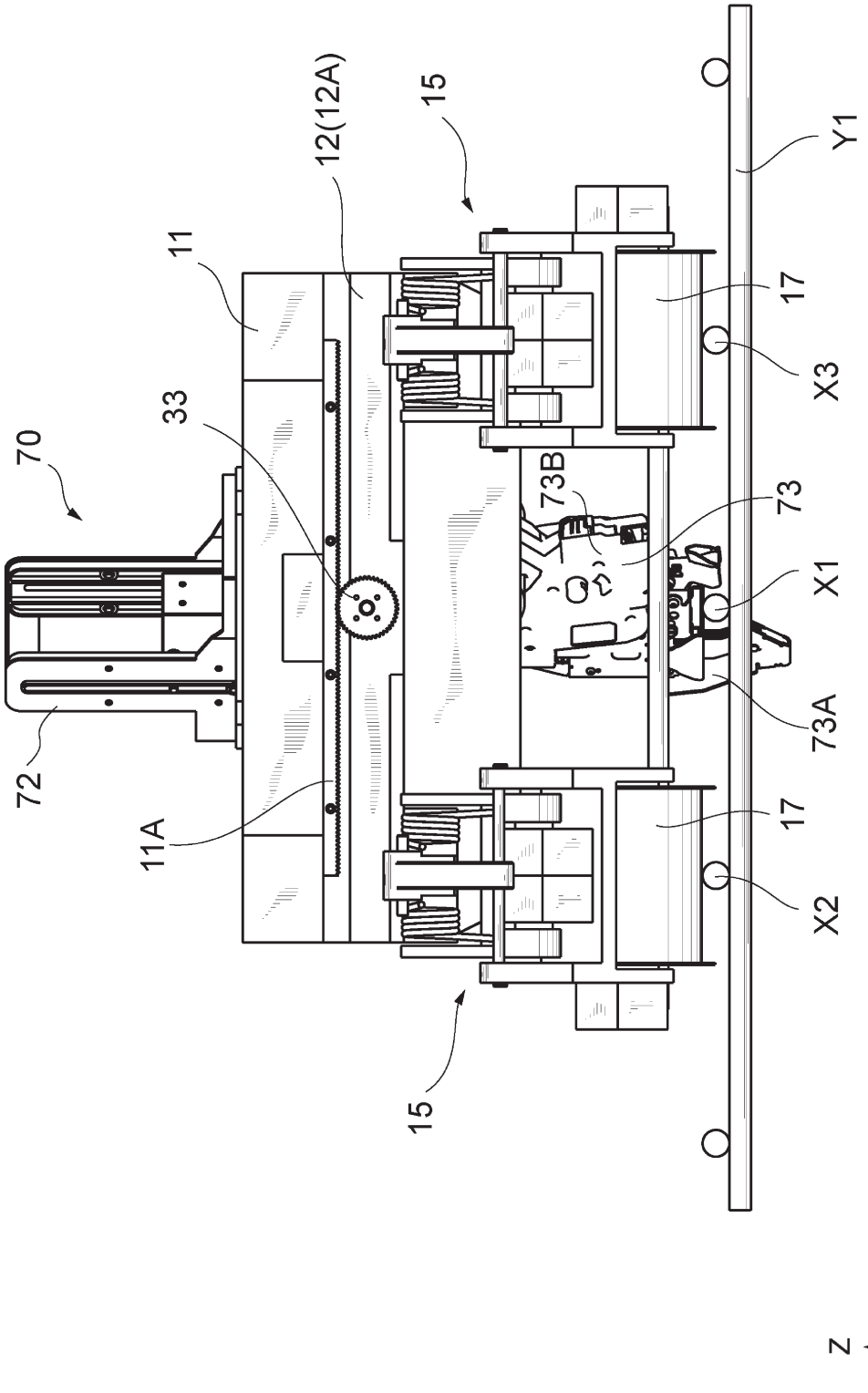


FIG. 12B

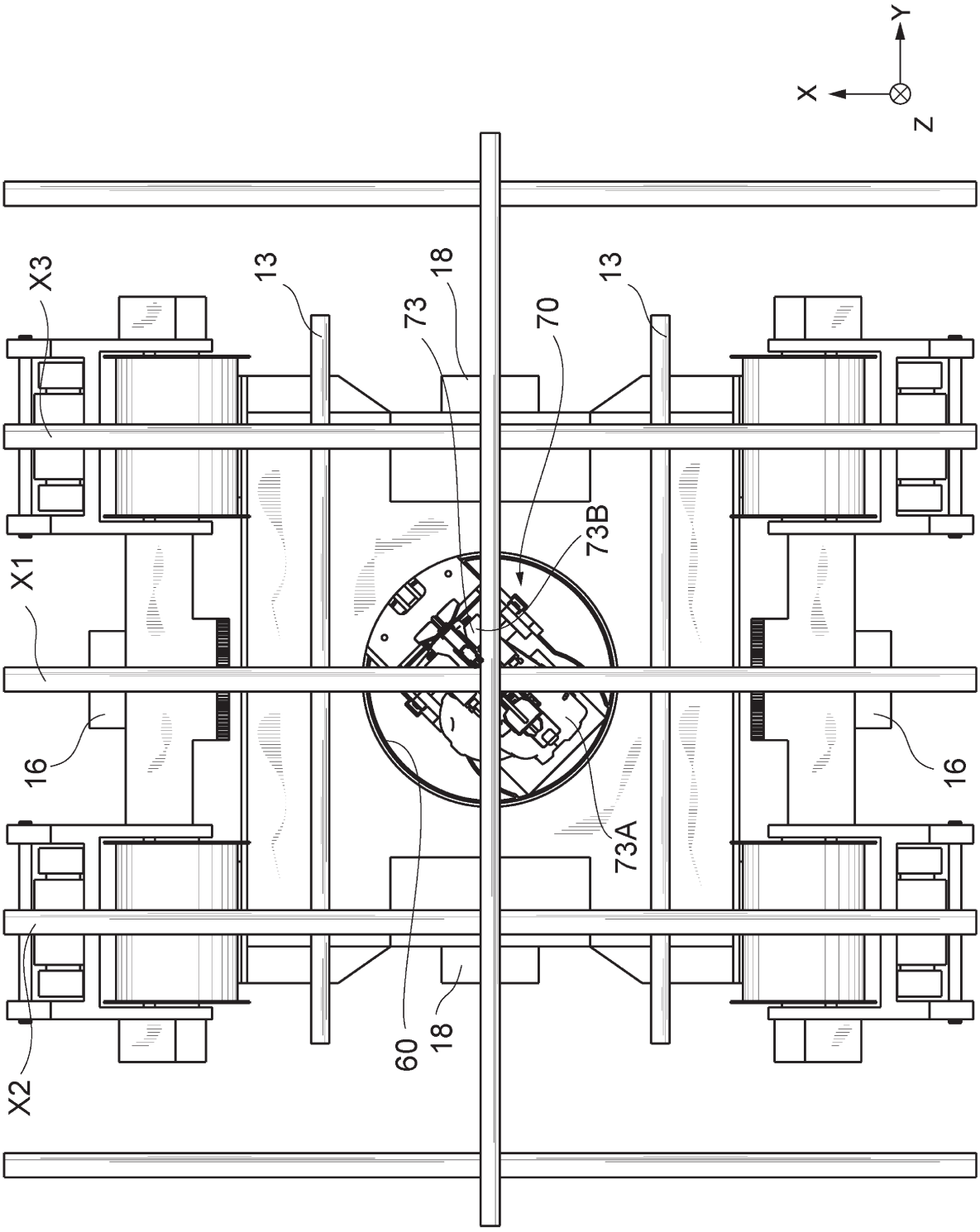


FIG. 12C

FIG. 13

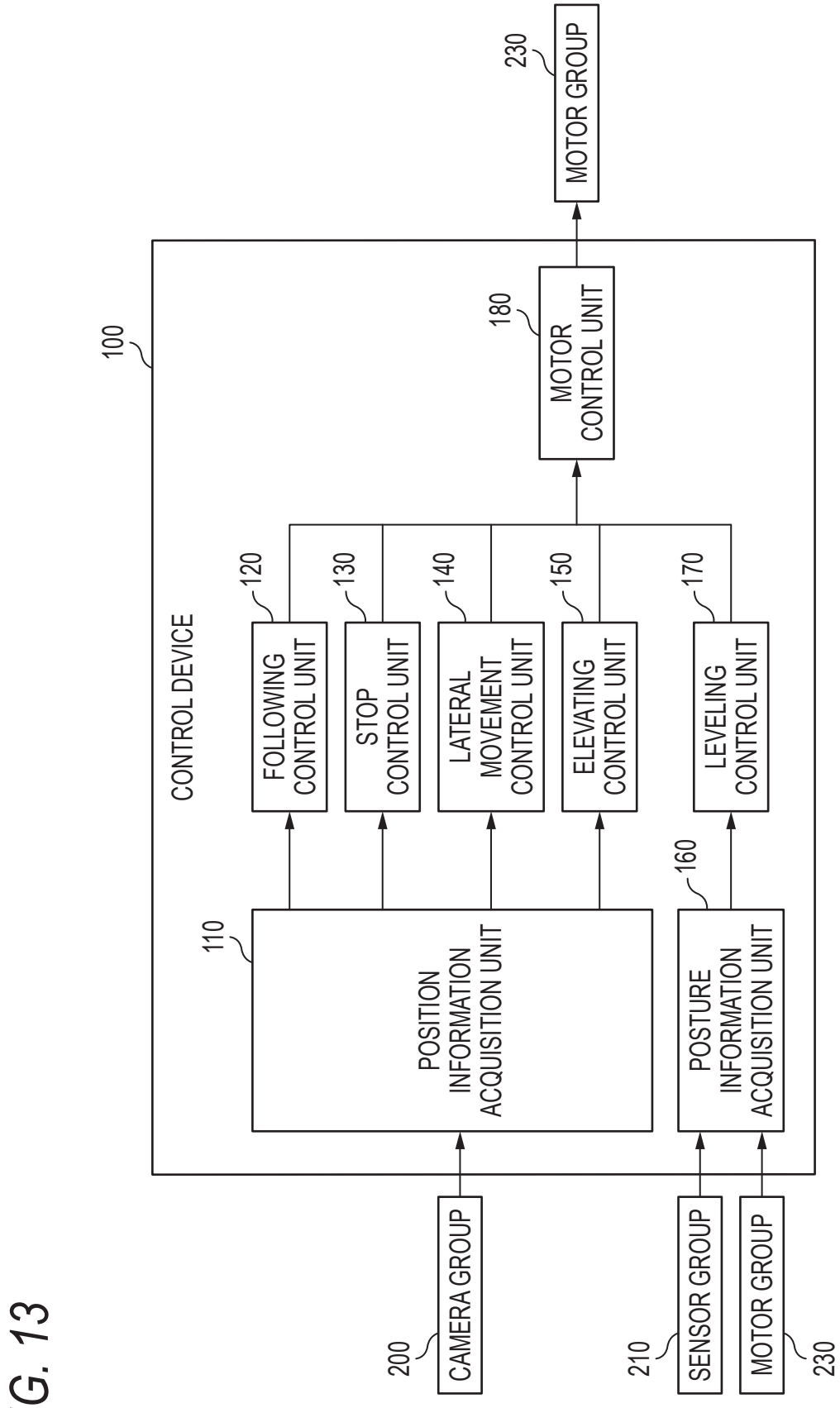

100
CONTROL DEVICE
110
POSITION INFORMATION ACQUISITION UNIT
120
FOLLOWING CONTROL UNIT
130
STOP CONTROL UNIT
140
LATERAL MOVEMENT CONTROL UNIT
150
ELEVATING CONTROL UNIT
160
POSTURE INFORMATION ACQUISITION UNIT
170
LEVELING CONTROL UNIT
180
MOTOR CONTROL UNIT
230
MOTOR GROUP
200
CAMERA GROUP
210
SENSOR GROUP
230
MOTOR GROUP

FIG. 14

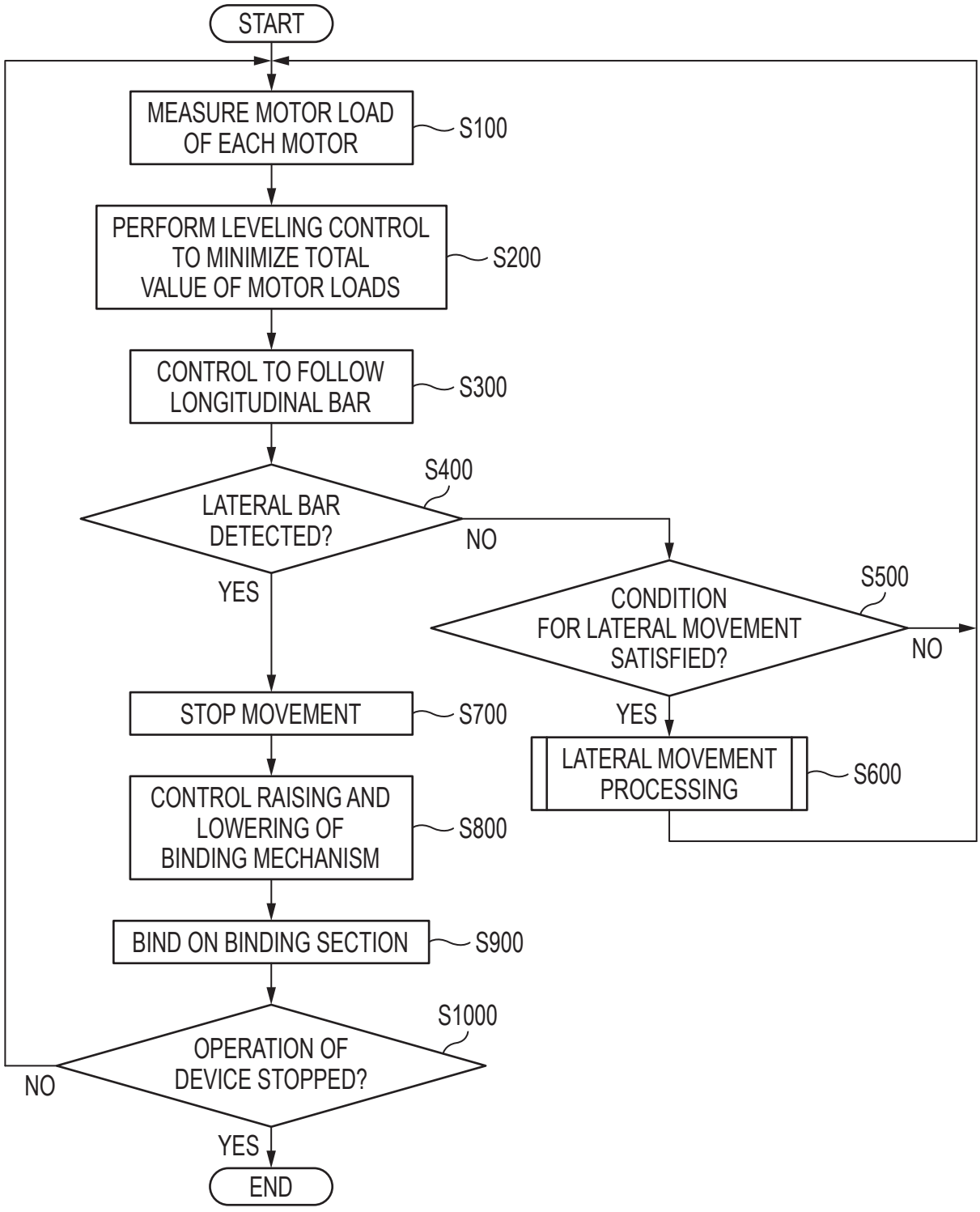

START
MEASURE MOTOR LOAD OF EACH MOTOR
S100
PERFORM LEVELING CONTROL TO MINIMIZE TOTAL VALUE OF MOTOR LOADS
S200
CONTROL TO FOLLOW LONGITUDINAL BAR
S300
S400
LATERAL BAR DETECTED?
NO
YES
S500
CONDITION FOR LATERAL MOVEMENT SATISFIED?
NO
YES
LATERAL MOVEMENT PROCESSING
S600
STOP MOVEMENT
S700
CONTROL RAISING AND LOWERING OF BINDING MECHANISM
S800
BIND ON BINDING SECTION
S900
S1000
OPERATION OF DEVICE STOPPED?
NO
YES
END

FIG. 15A

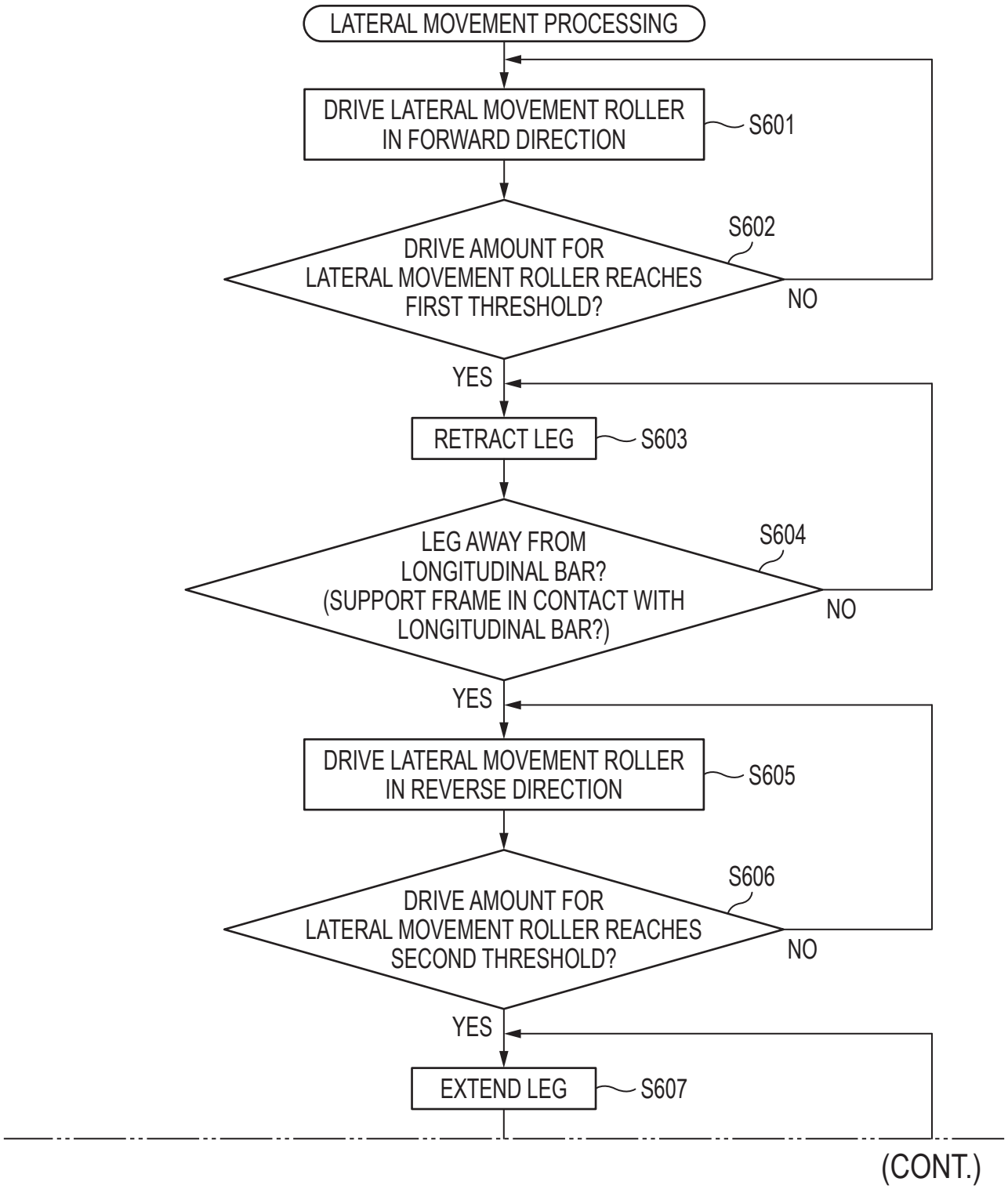
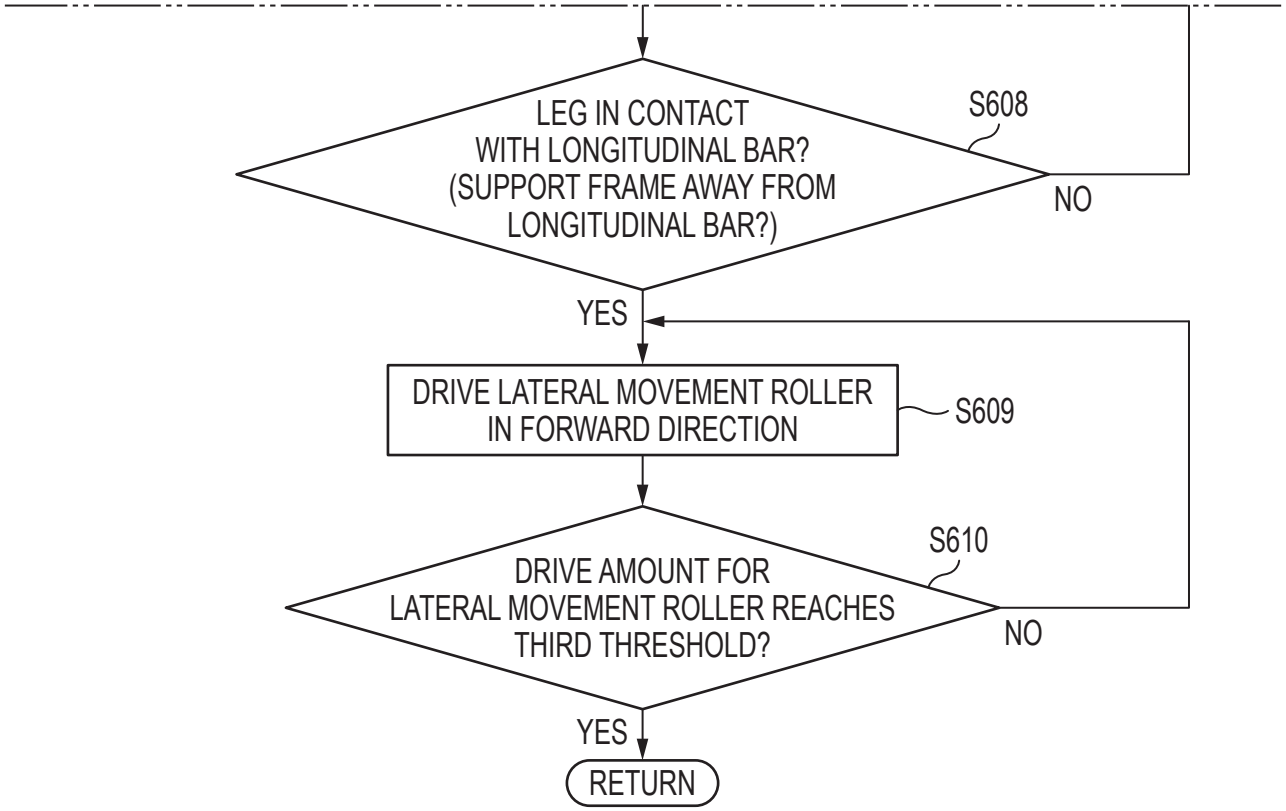

LATERAL MOVEMENT PROCESSING
DRIVE LATERAL MOVEMENT ROLLER IN FORWARD DIRECTION
S601
DRIVE AMOUNT FOR LATERAL MOVEMENT ROLLER REACHES FIRST THRESHOLD?
S602
NO
YES
RETRACT LEG
S603
LEG AWAY FROM LONGITUDINAL BAR? (SUPPORT FRAME IN CONTACT WITH LONGITUDINAL BAR?)
S604
NO
YES
DRIVE LATERAL MOVEMENT ROLLER IN REVERSE DIRECTION
S605
DRIVE AMOUNT FOR LATERAL MOVEMENT ROLLER REACHES SECOND THRESHOLD?
S606
NO
YES
EXTEND LEG
S607
(CONT.)

FIG. 15B

(CONTINUED FROM FIG.15A)



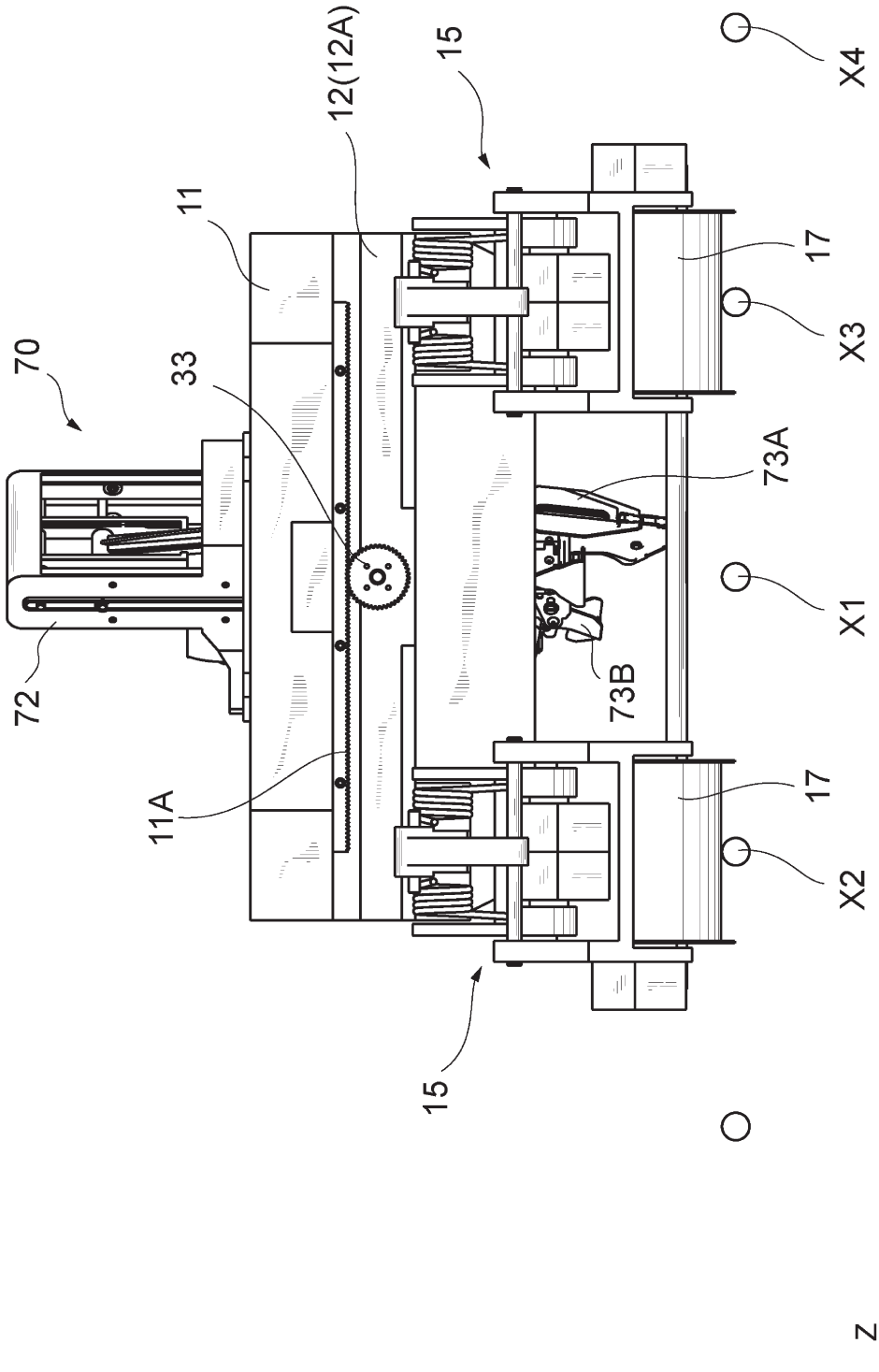
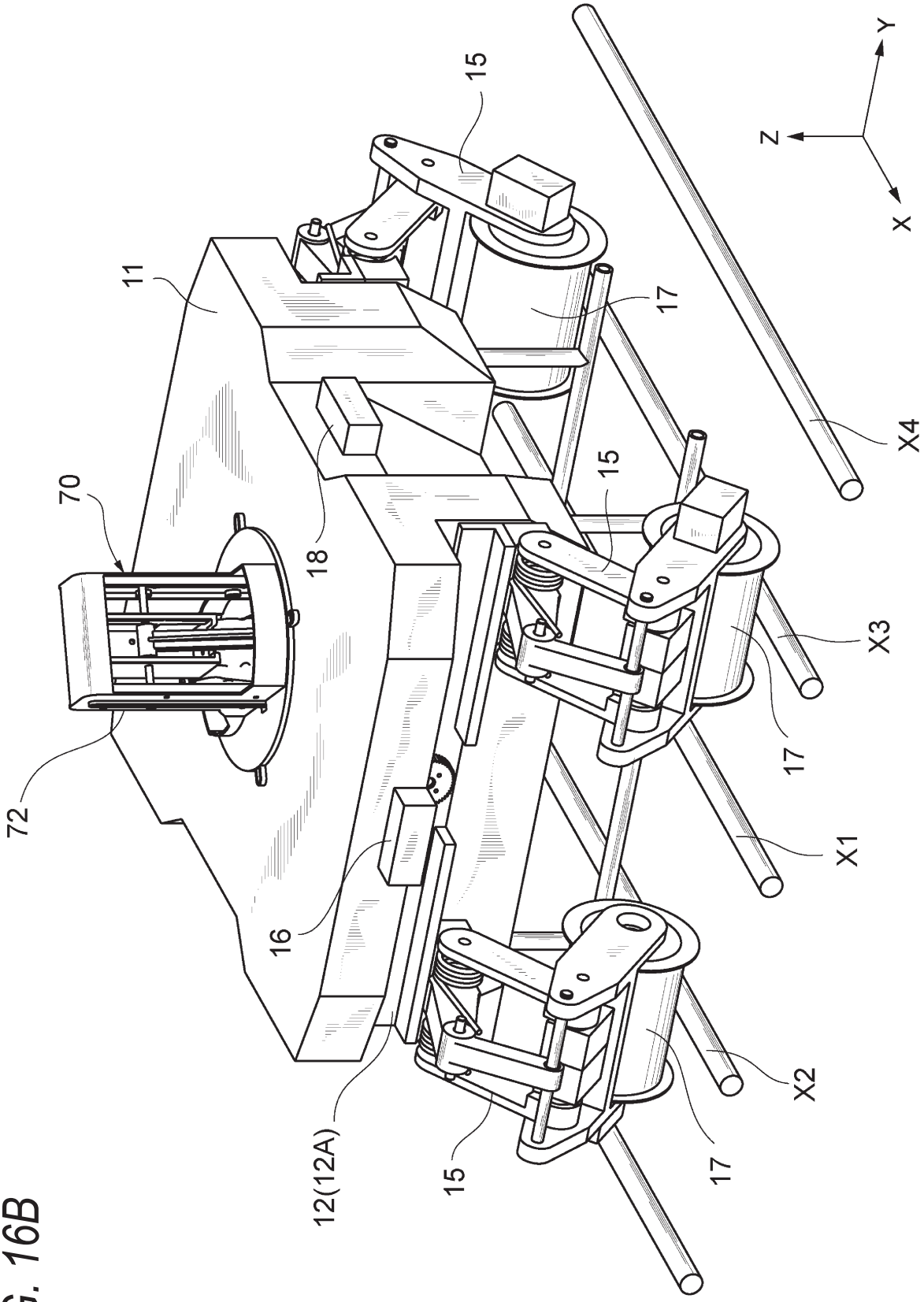


FIG. 16A

FIG. 16B



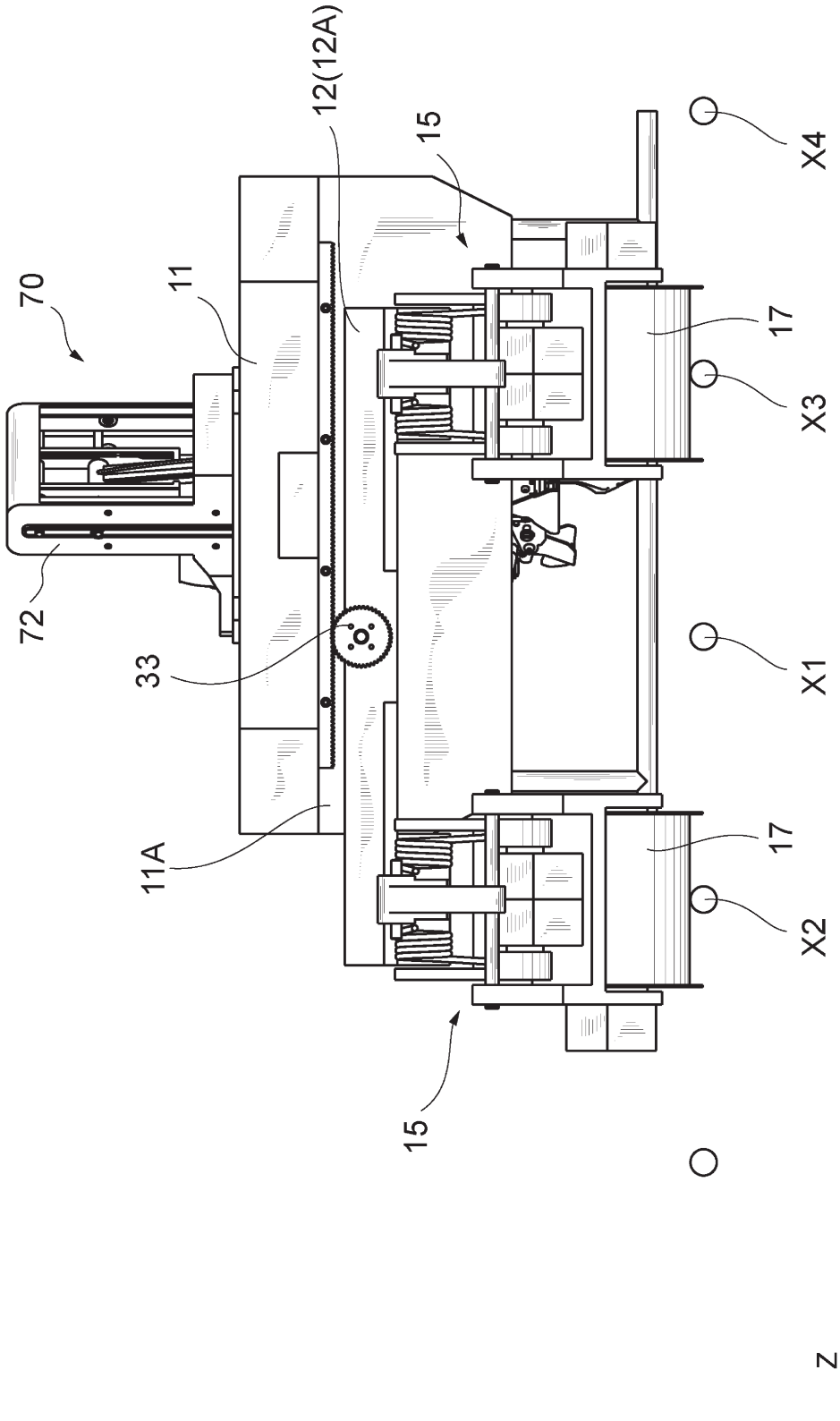
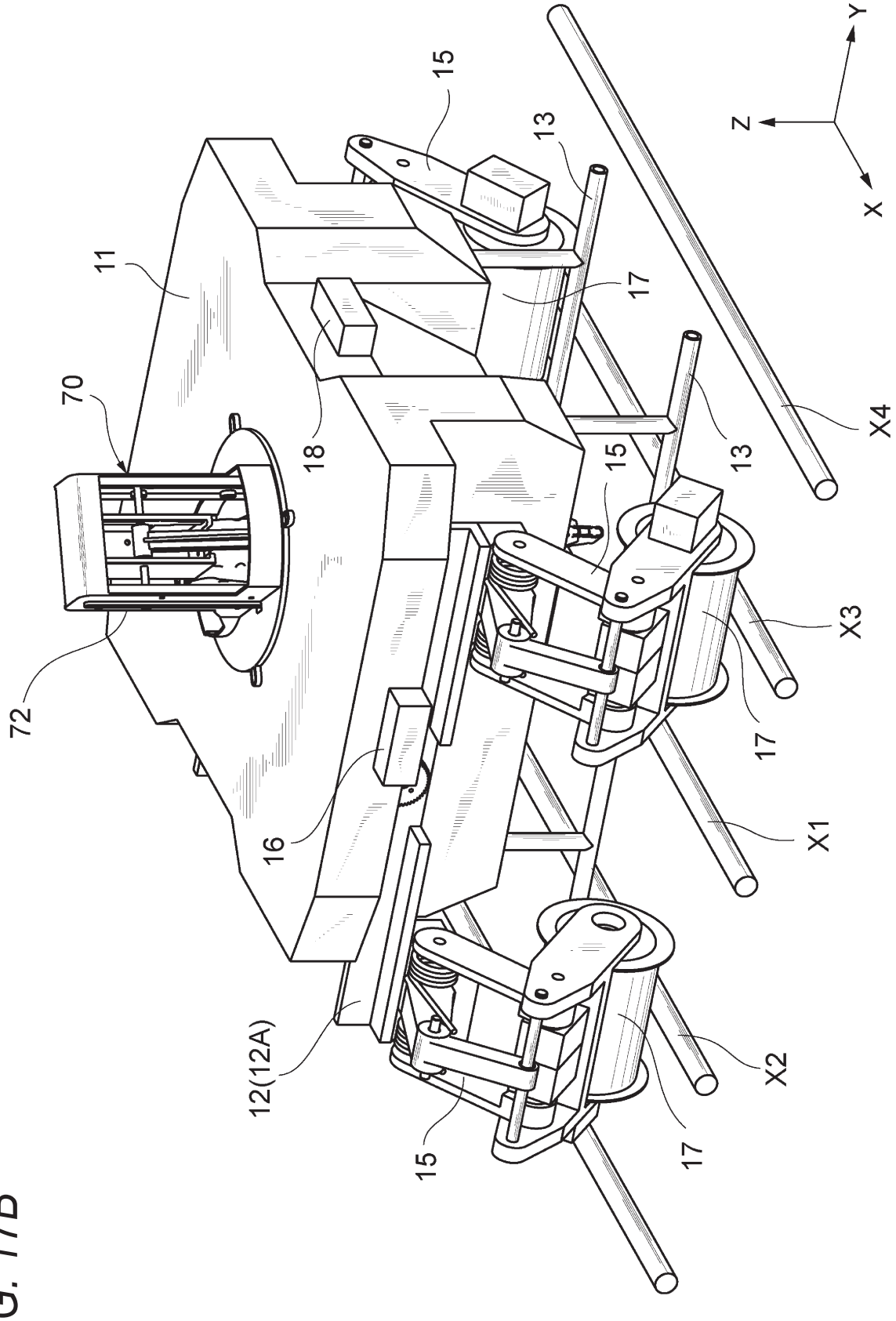


FIG. 17A

FIG. 17B



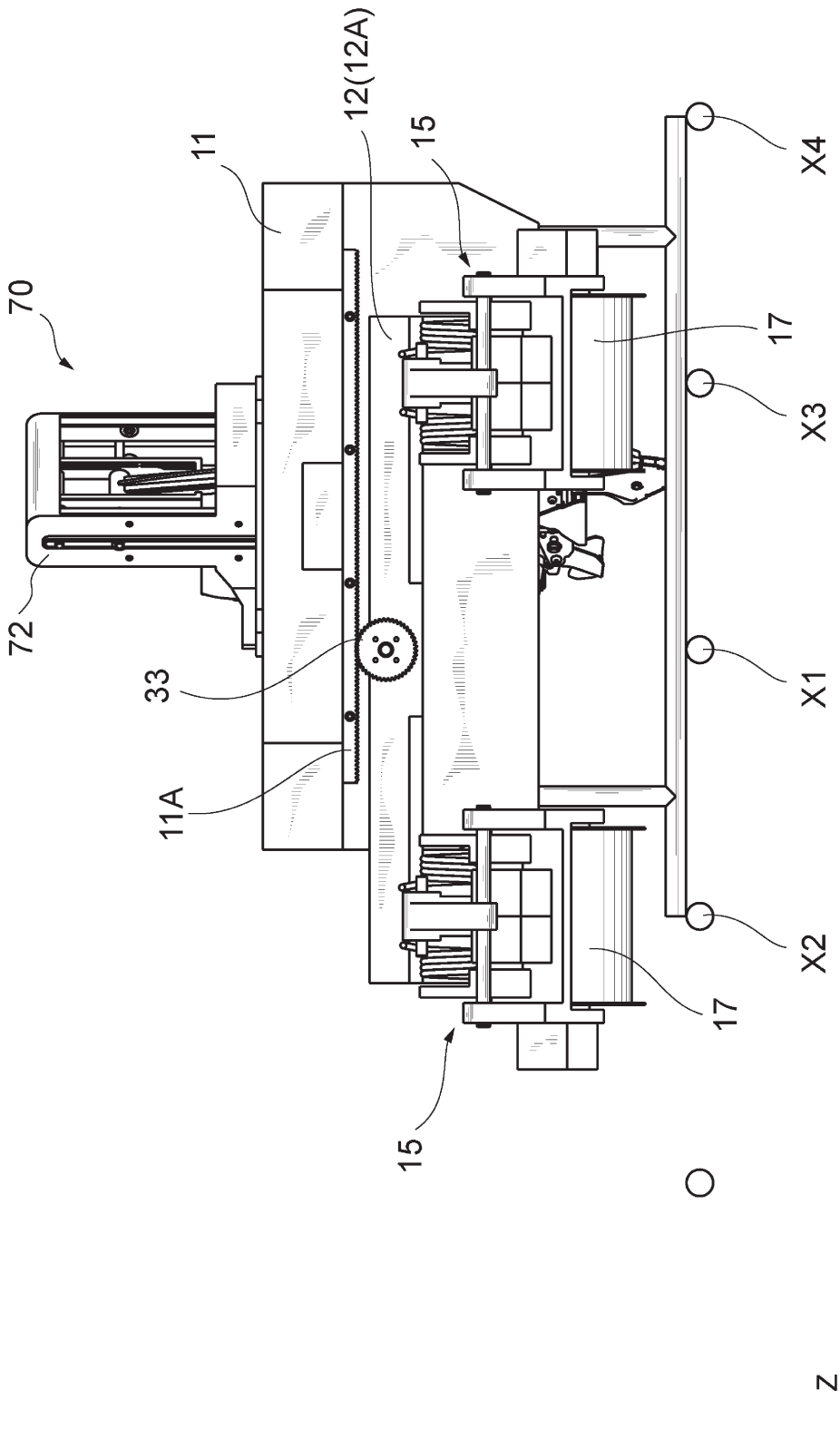
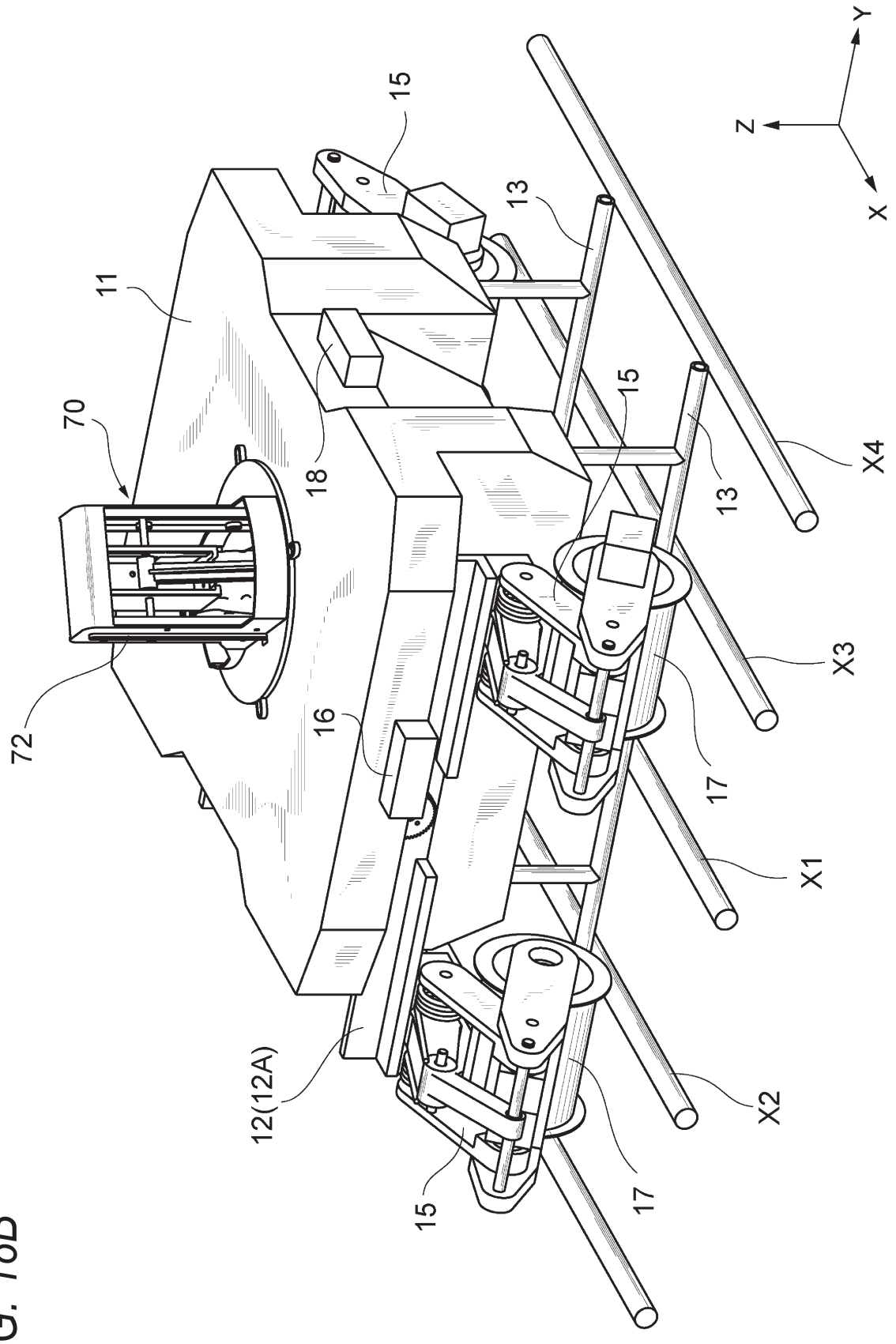


FIG. 18A

FIG. 18B



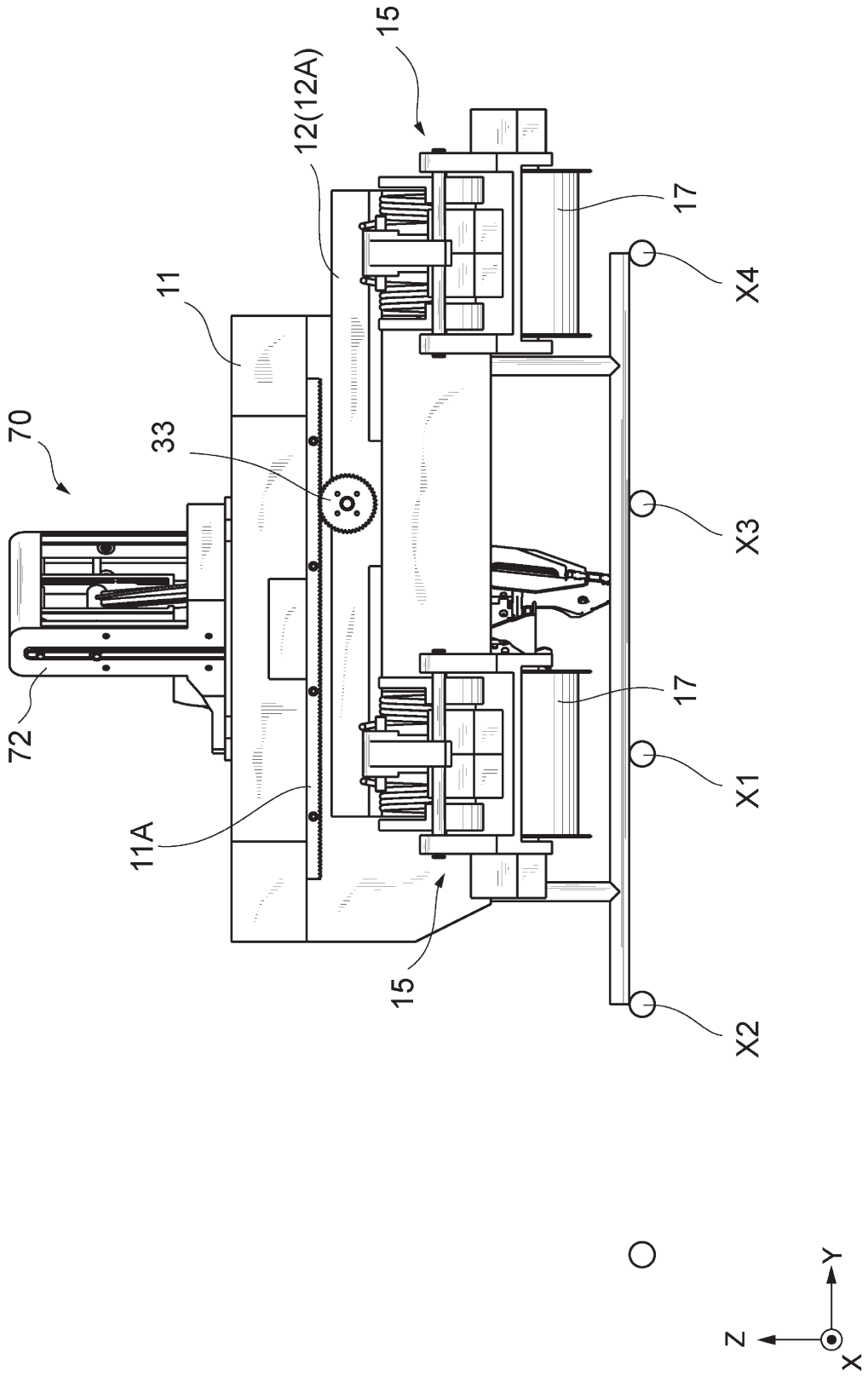


FIG. 19A

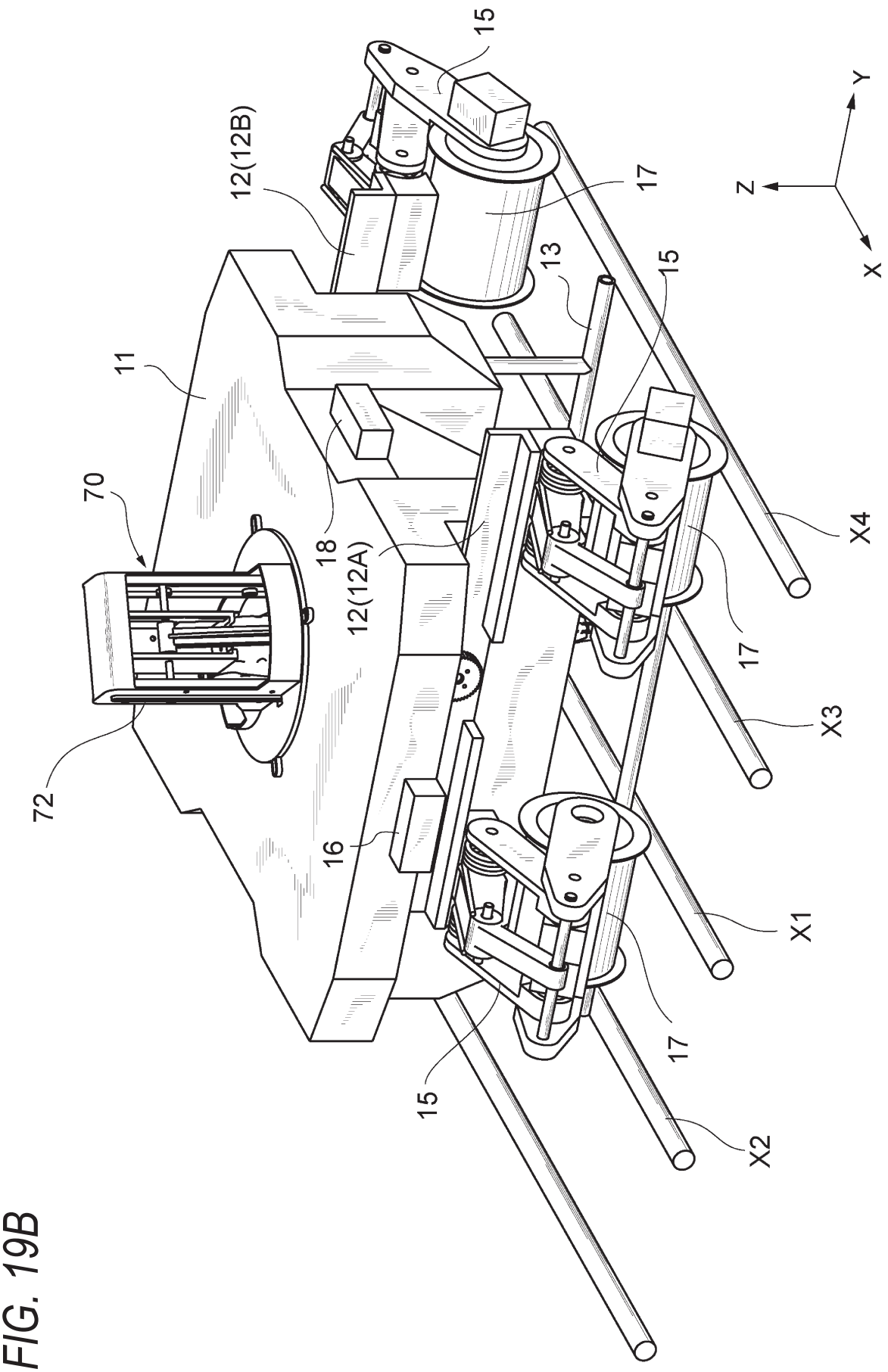


FIG. 19B

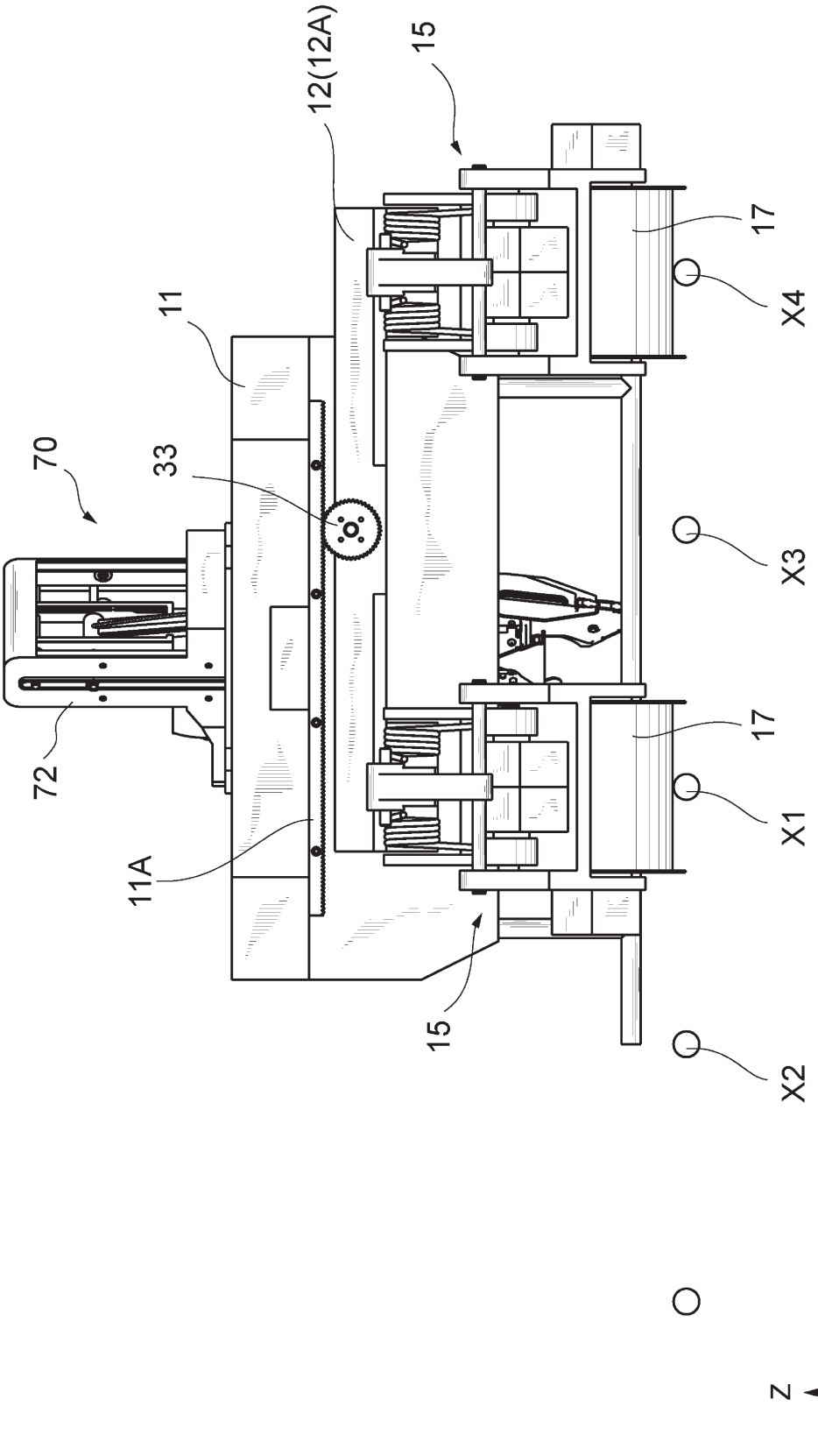


FIG. 20A

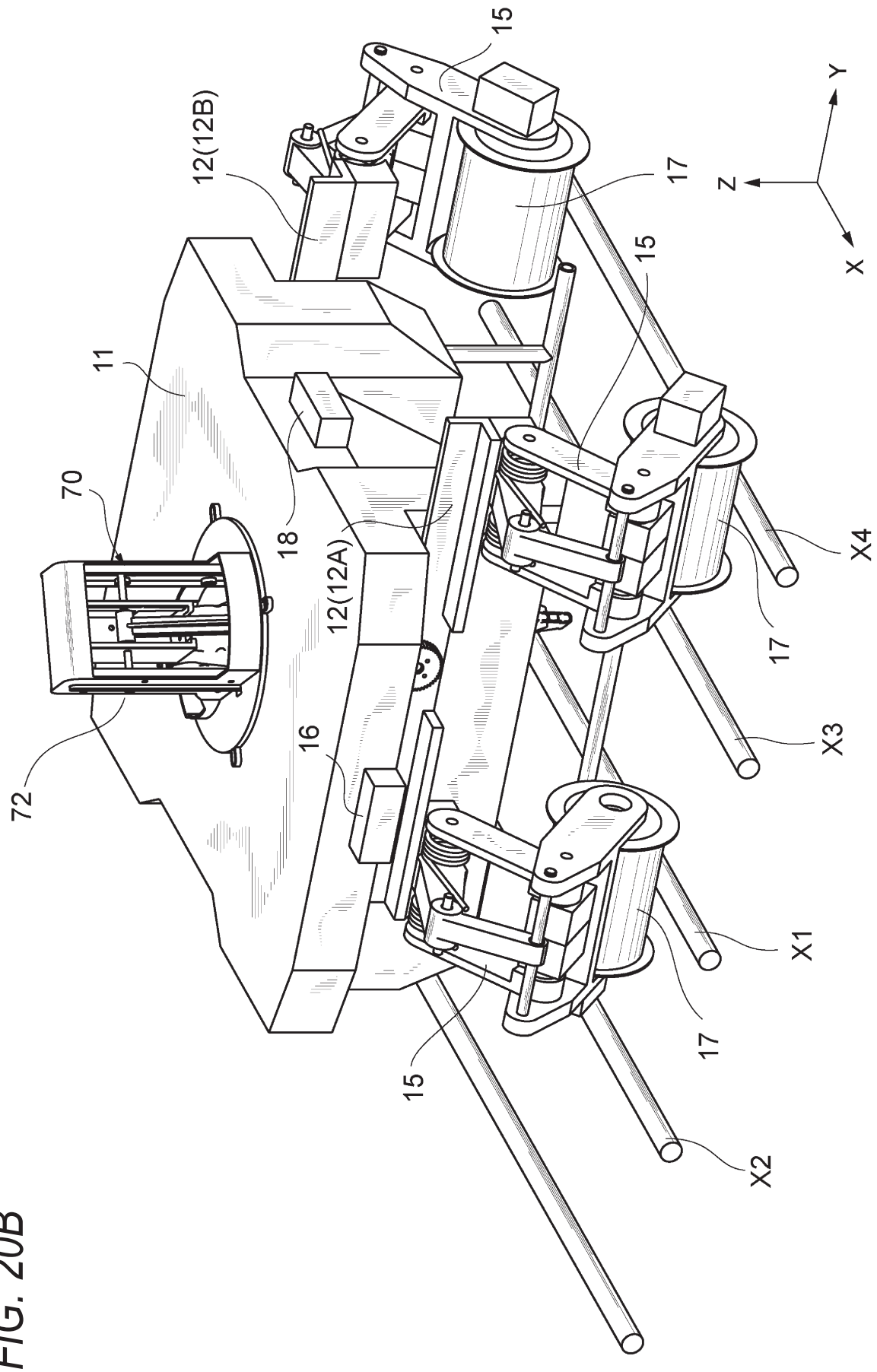


FIG. 20B

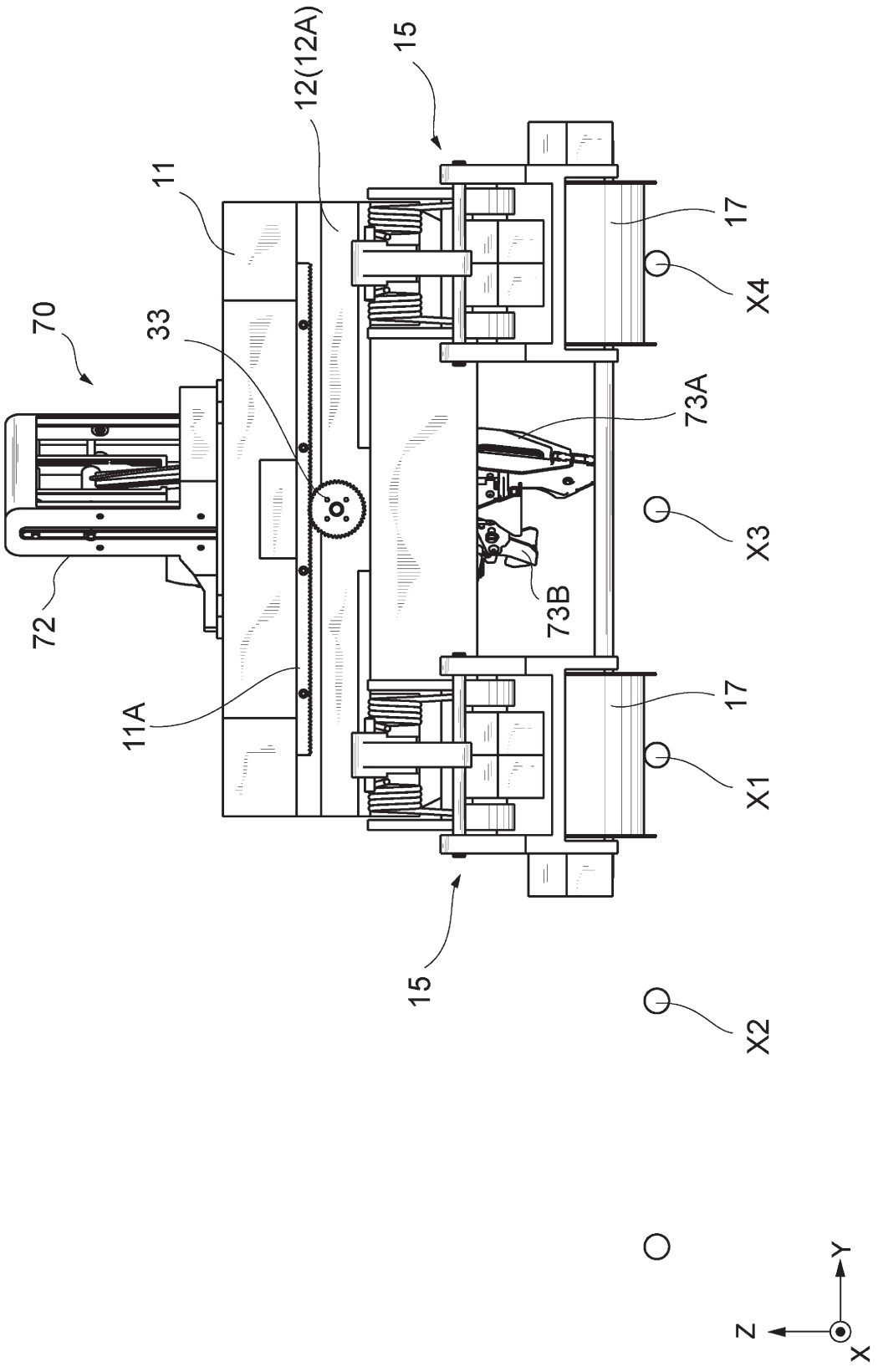


FIG. 21A

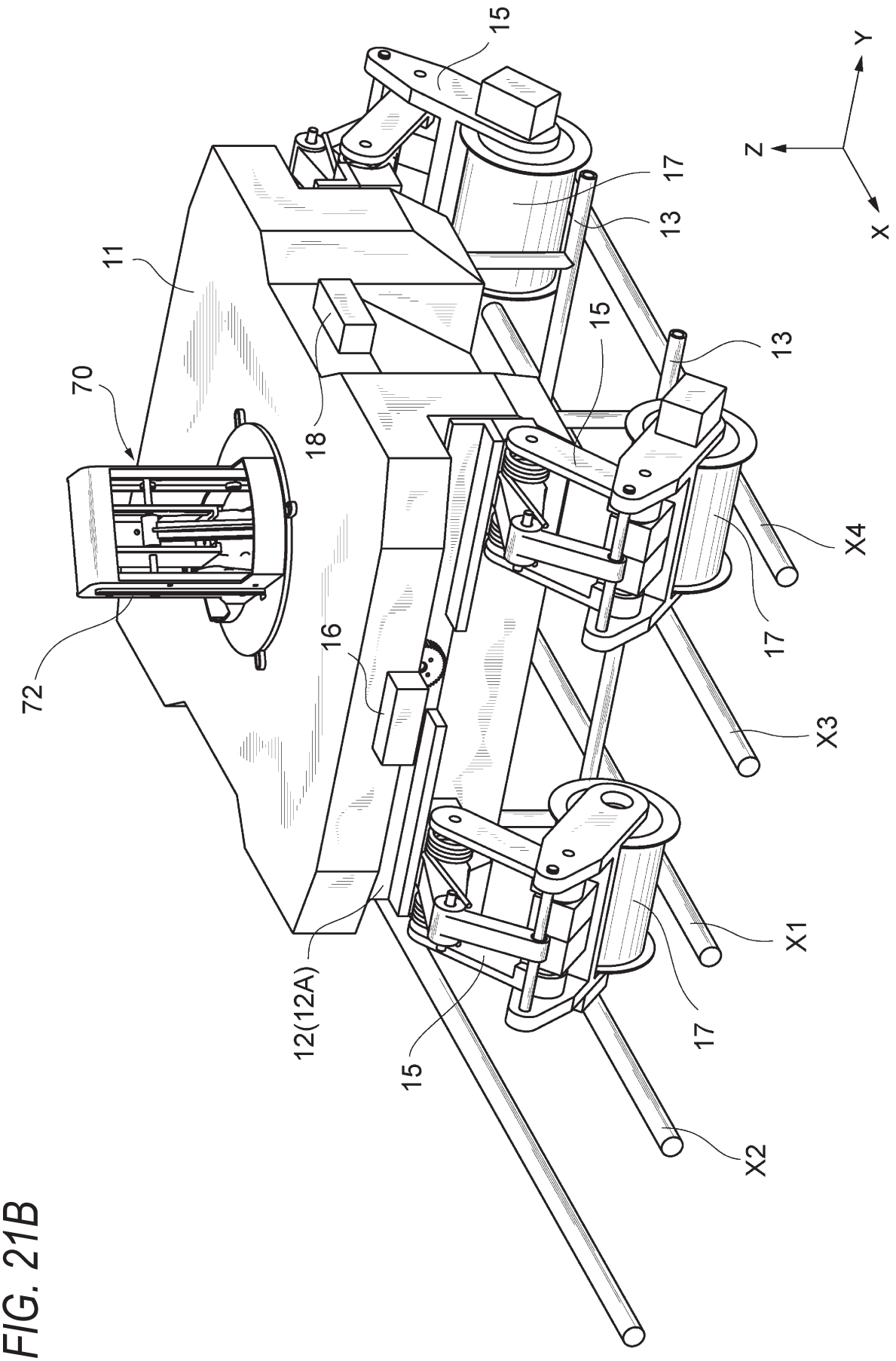


FIG. 21B