FIG. 1

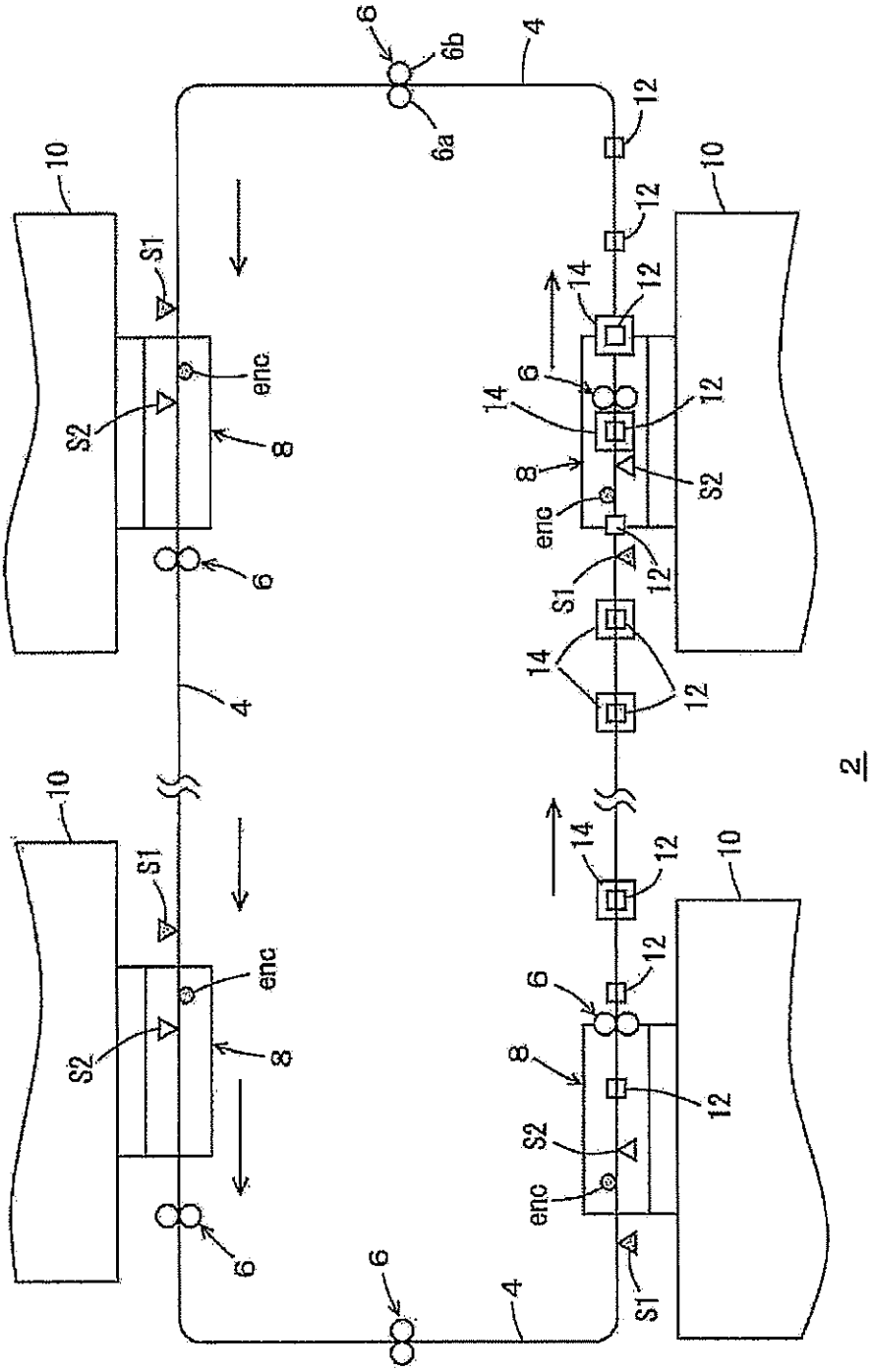


FIG. 2

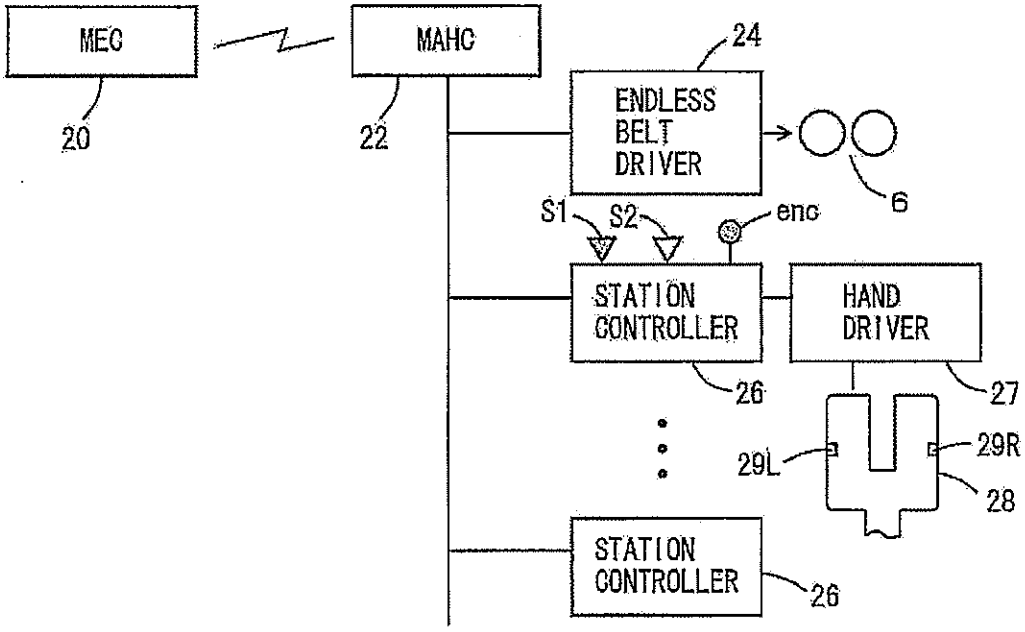

MEC
20
MAHC
22
24
ENDLESS BELT DRIVER
6
S1
S2
enc
STATION CONTROLLER
26
HAND DRIVER
27
29L
29R
28
STATION CONTROLLER
26

FIG. 3

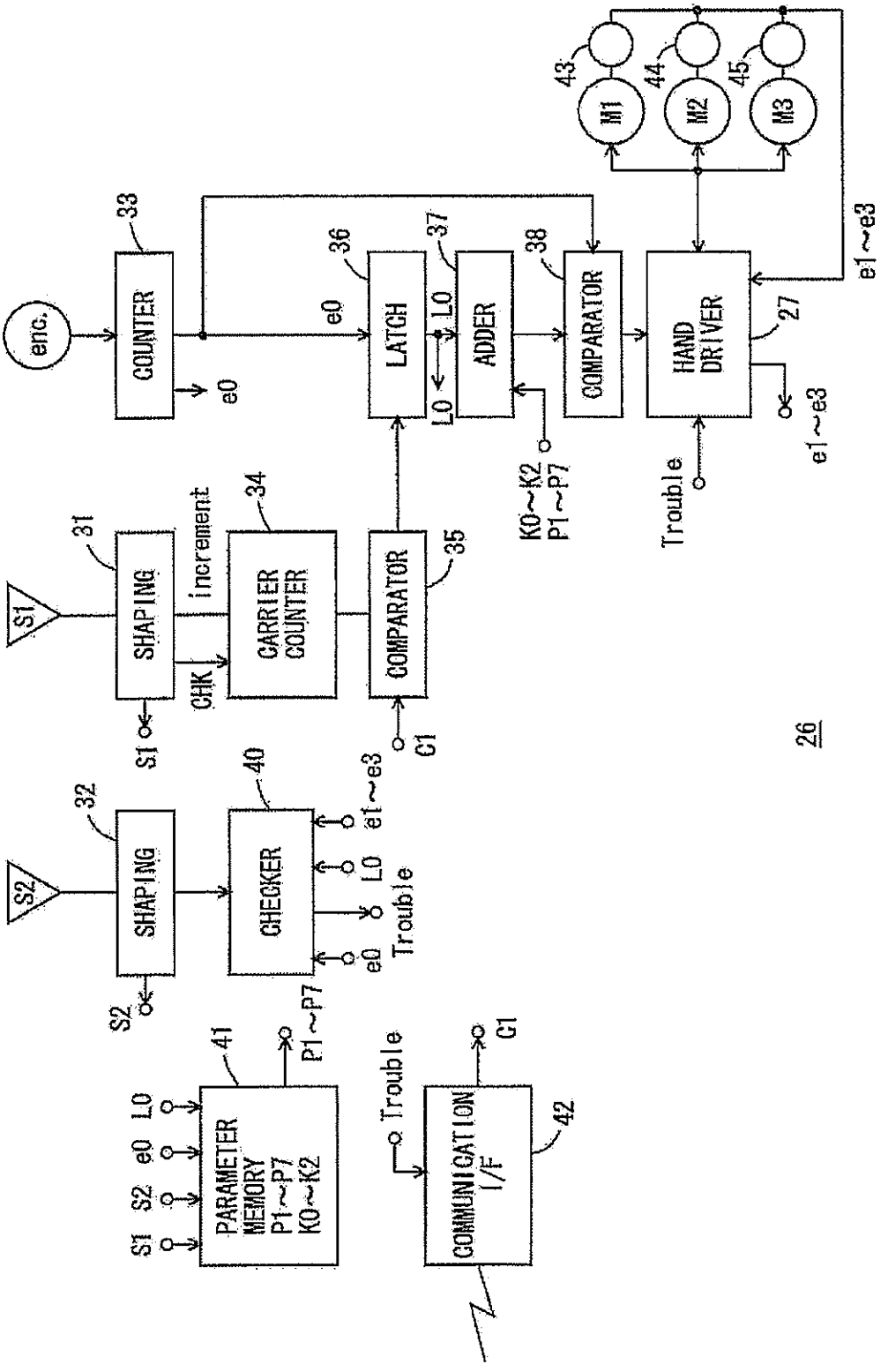

enc.
COUNTER
33
e0
LATCH
36
ADDER
37
COMPARATOR
38
HAND DRIVER
27
M1
M2
M3
43
44
45
e1~e3
L0
K0~K2
P1~P7
Trouble
S1
SHAPING
31
increment
CHK
CARRIER COUNTER
34
COMPARATOR
35
C1
S2
SHAPING
32
CHECKER
40
PARAMETER MEMORY P1~P7 K0~K2
41
COMMUNICATION I/F
42
26

FIG. 4

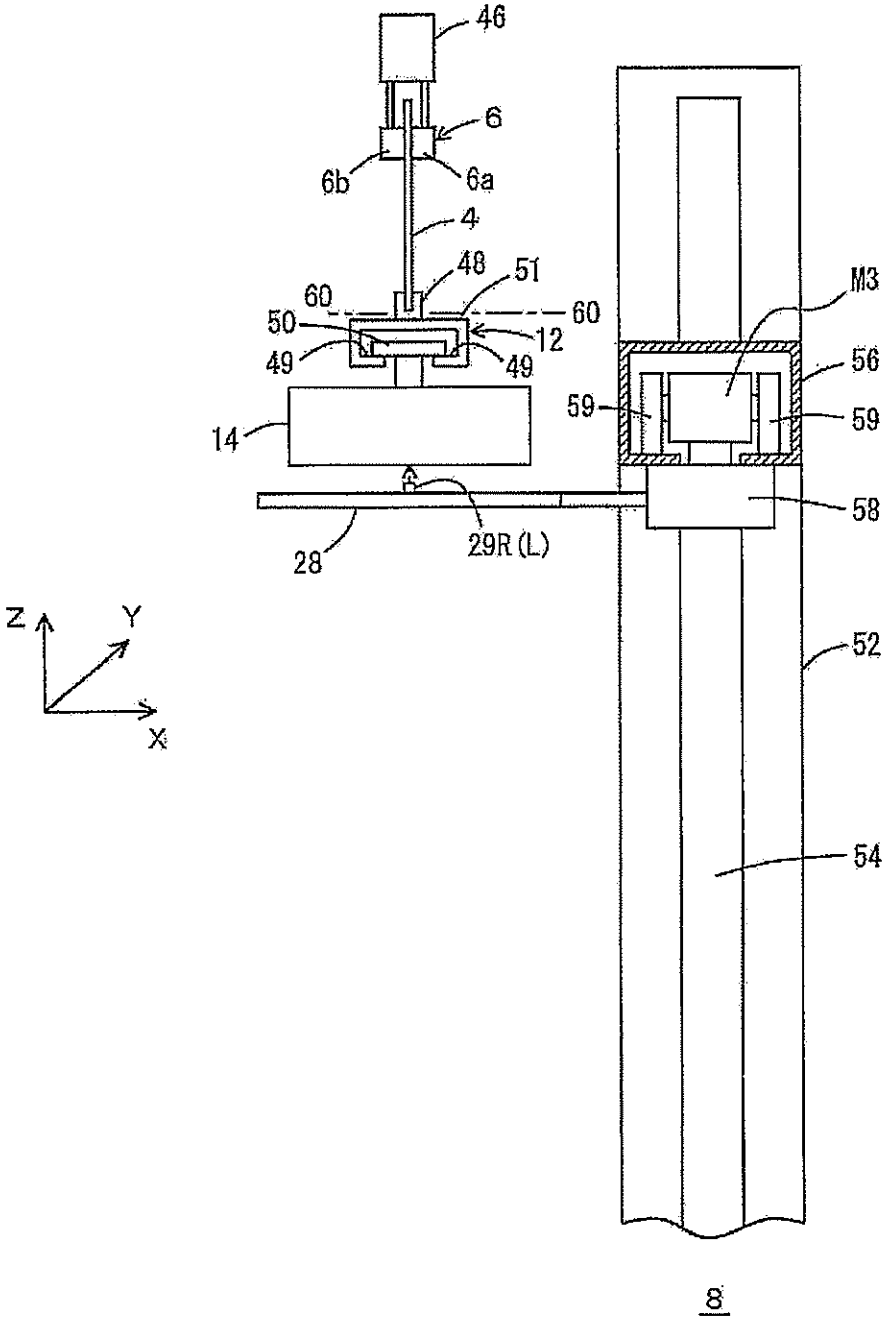
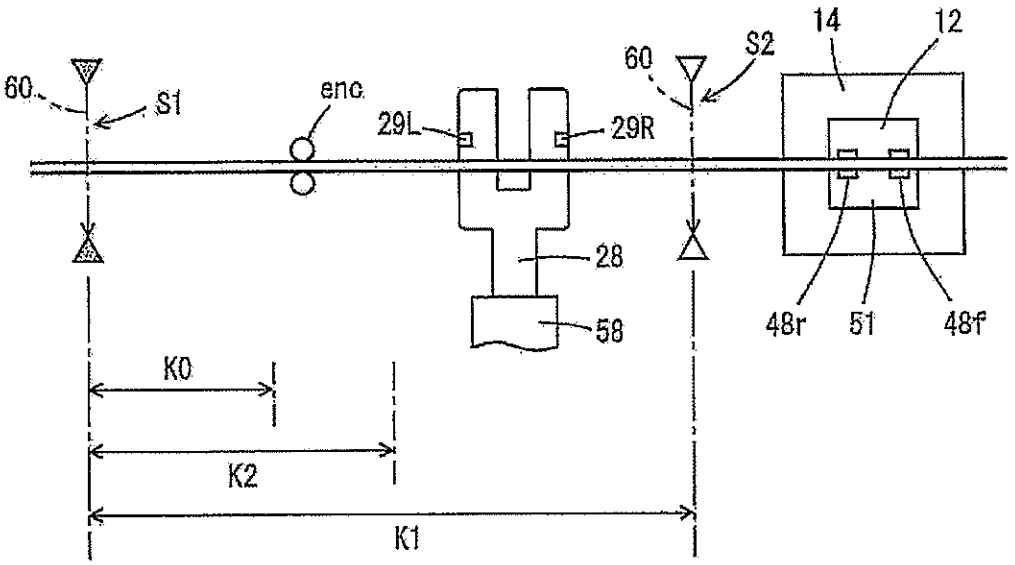
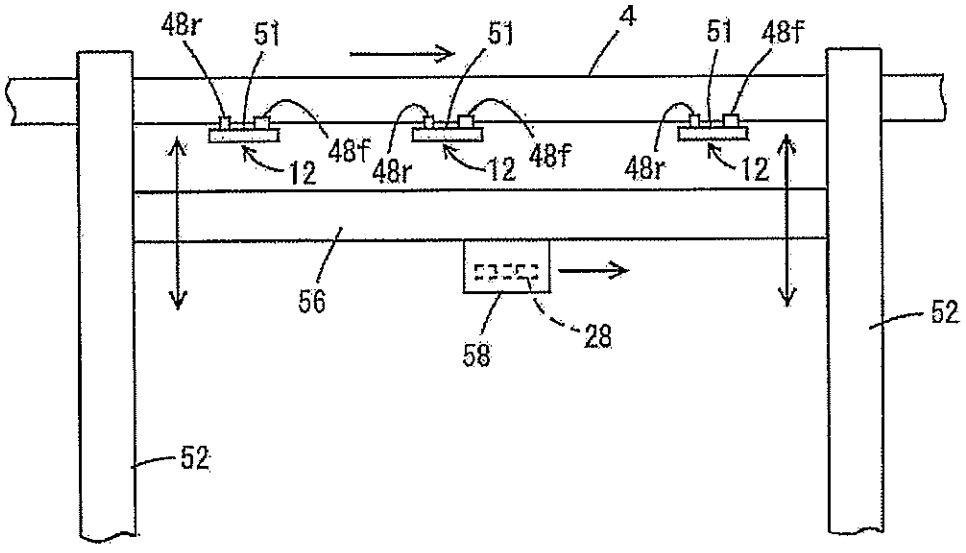

46
6
6b
6a
4
48
51
60
60
50
12
49
49
14
M3
56
59
59
58
28
29R (L)
52
54
8
Z
Y
X

FIG. 5


60
S1
enc
29L
29R
60
S2
14
12
28
58
48r
51
48f
K0
K2
K1

8

FIG. 6


48r
51
51
4
51
48f
12
48f
48r
12
48f
48r
12
56
58
28
52
52

8

FIG. 7

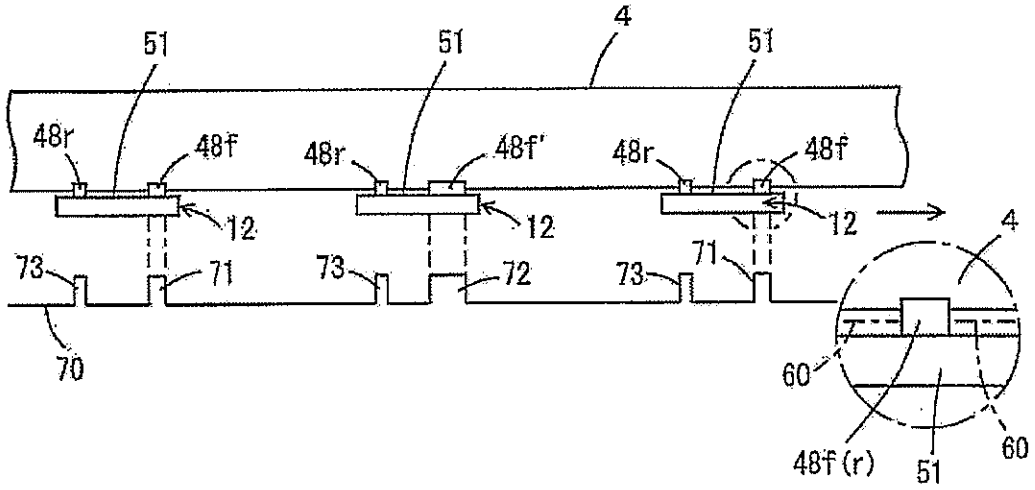

51
51
4
51
48r
48f
48r
48f'
48r
48f
12
12
12
4
73
71
73
72
73
71
70
60
48f(r)
51
60

FIG. 8

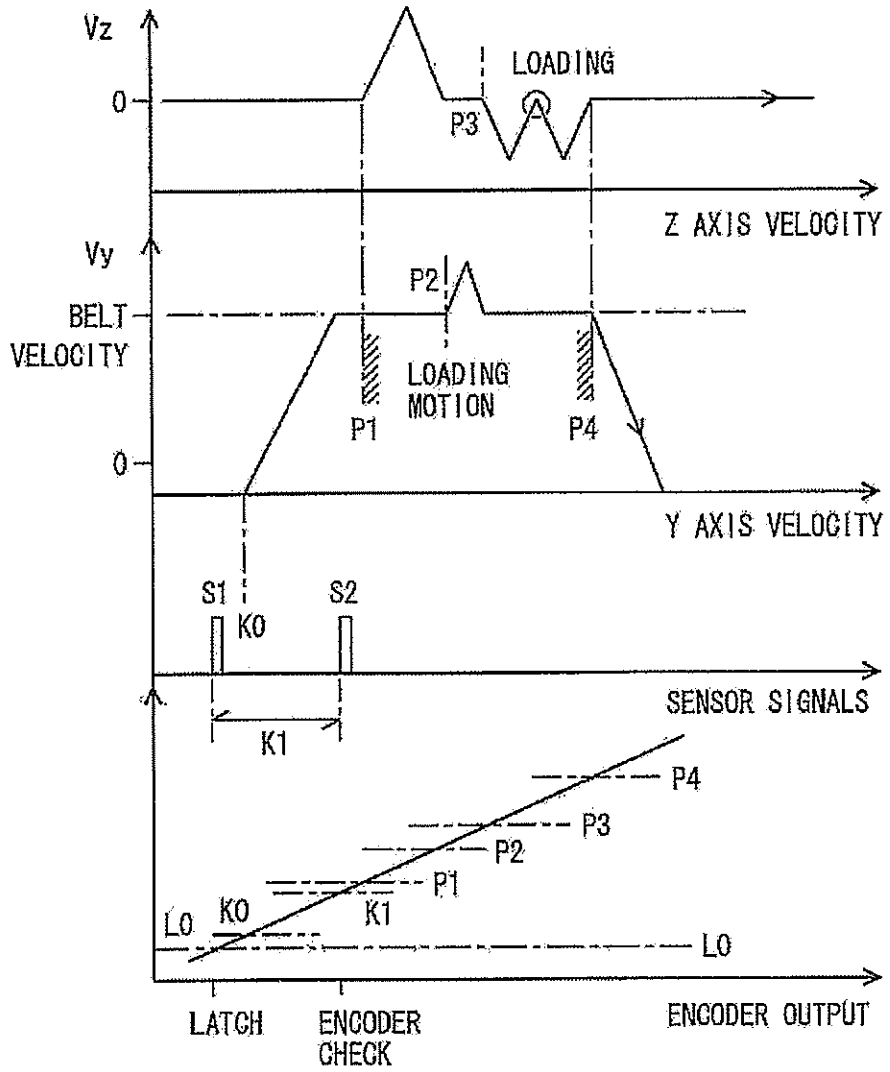

Vz
0
LOADING
P3
Z AXIS VELOCITY
Vy
P2
BELT
VELOCITY
LOADING
MOTION
P1
P4
0
Y AXIS VELOCITY
S1
S2
K0
SENSOR SIGNALS
K1
P4
P3
P2
P1
L0
K0
K1
L0
LATCH
ENCODER
CHECK
ENCODER OUTPUT

FIG. 9

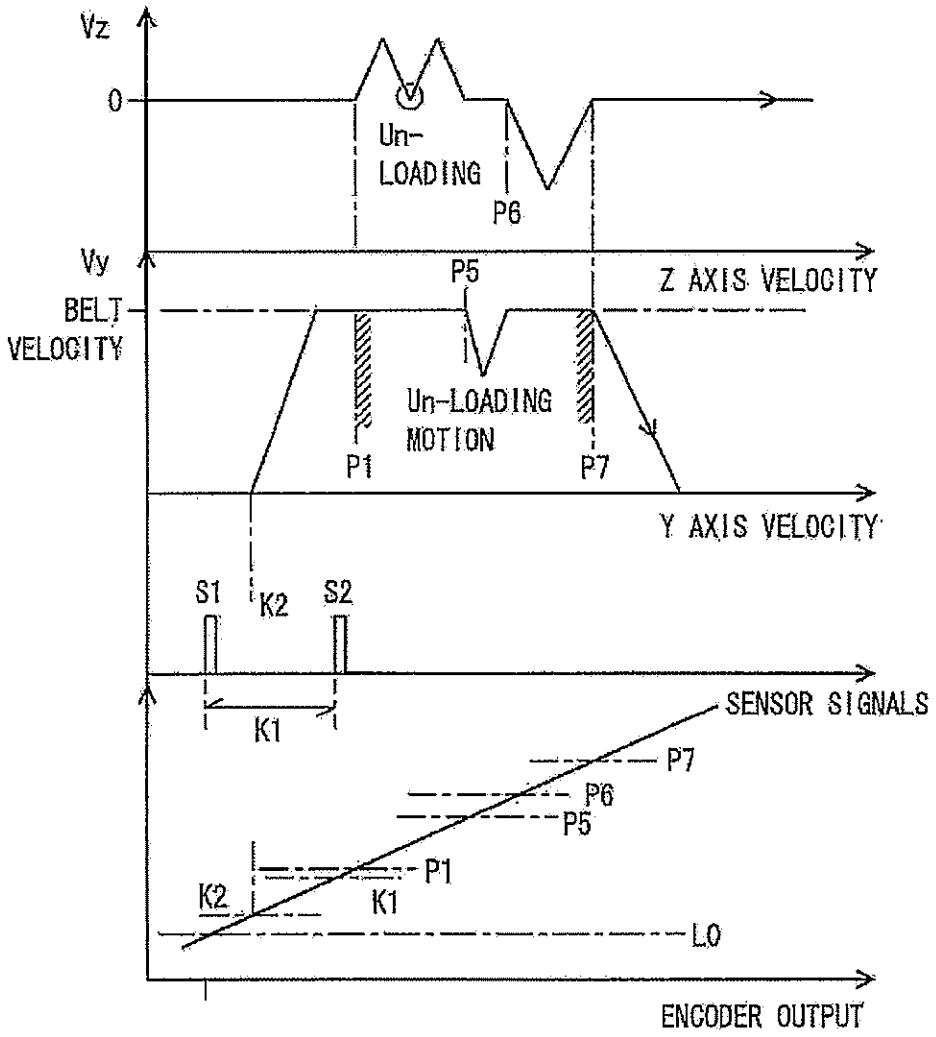

Vz
0
Un-
LOADING
P6
Vy
BELT
VELOCITY
P5
Z AXIS VELOCITY
Un-LOADING
MOTION
P1
P7
Y AXIS VELOCITY
S1
K2
S2
K1
SENSOR SIGNALS
P7
P6
P5
P1
K2
K1
L0
ENCODER OUTPUT

FIG. 10

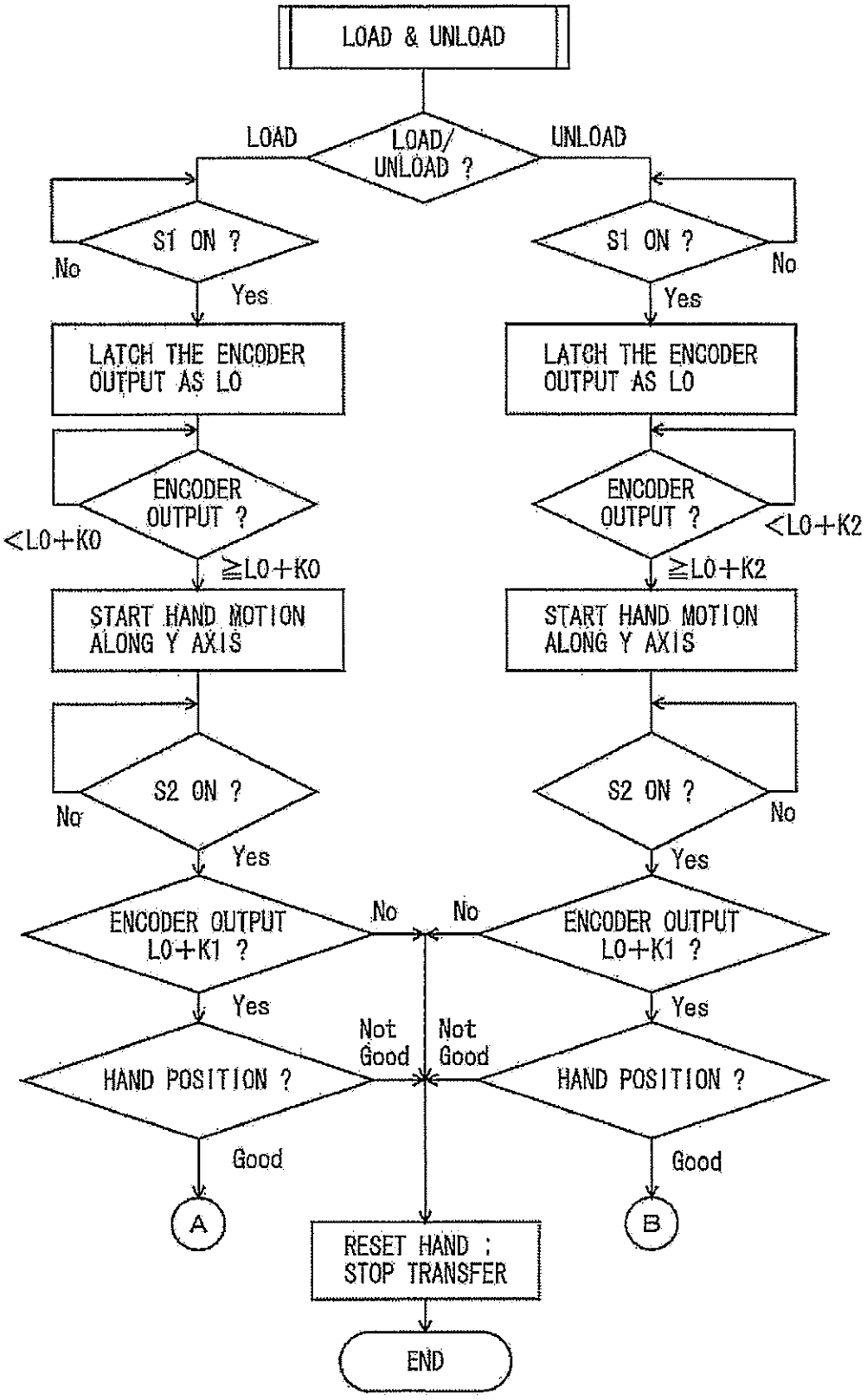
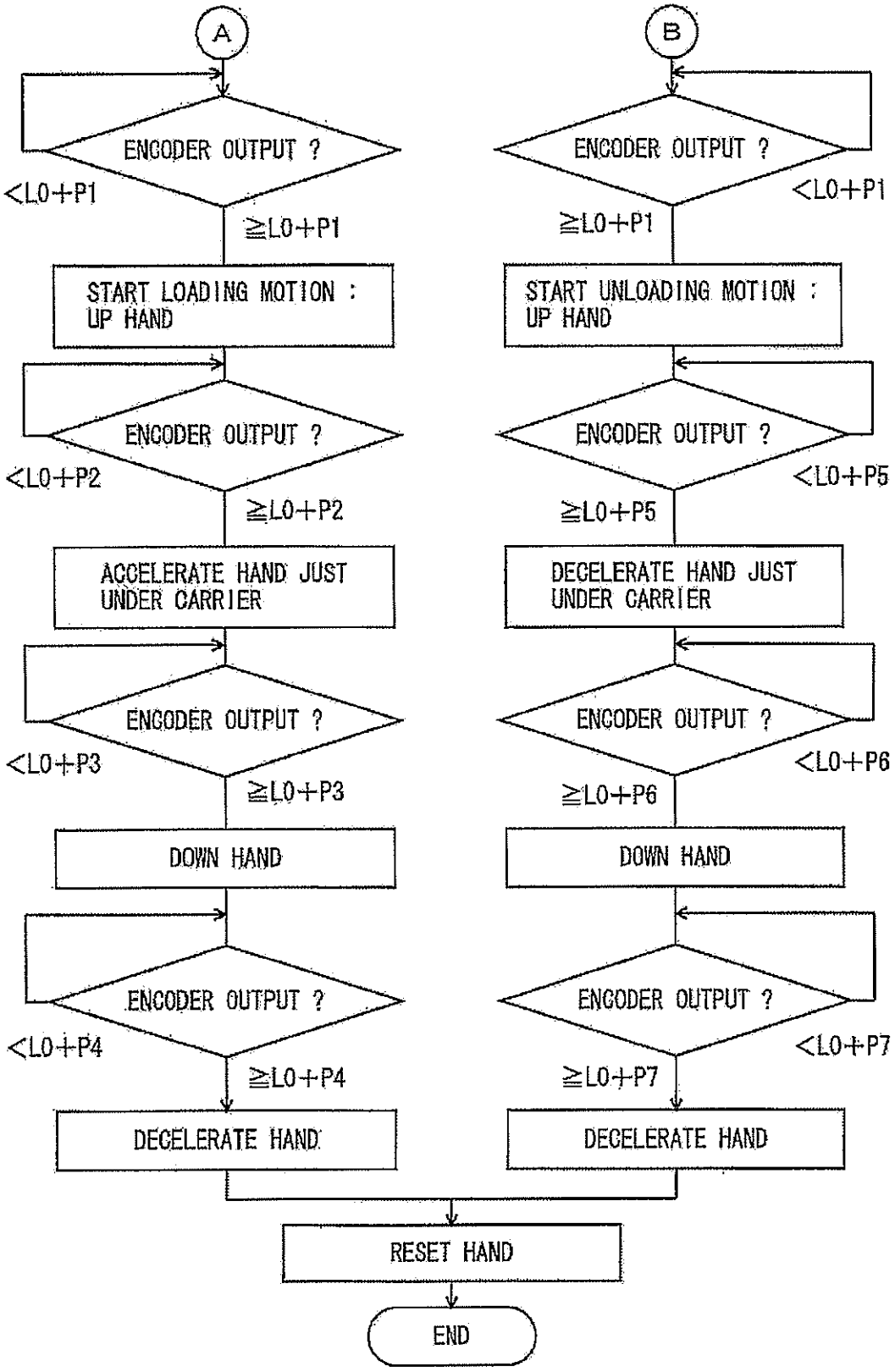

LOAD & UNLOAD
LOAD/ UNLOAD ?
LOAD
UNLOAD
S1 ON ?
No
Yes
S1 ON ?
No
Yes
LATCH THE ENCODER OUTPUT AS L0
LATCH THE ENCODER OUTPUT AS L0
ENCODER OUTPUT ?
<L0+K0
≧L0+K0
ENCODER OUTPUT ?
<L0+K2
≧L0+K2
START HAND MOTION ALONG Y AXIS
START HAND MOTION ALONG Y AXIS
S2 ON ?
No
Yes
S2 ON ?
No
Yes
ENCODER OUTPUT L0+K1 ?
No
No
ENCODER OUTPUT L0+K1 ?
Yes
Yes
HAND POSITION ?
Not Good
Not Good
HAND POSITION ?
Good
Good
A
B
RESET HAND ; STOP TRANSFER
END

FIG. 11


A
ENCODER OUTPUT ?
<L0+P1
≧L0+P1
START LOADING MOTION : UP HAND
ENCODER OUTPUT ?
<L0+P2
≧L0+P2
ACCELERATE HAND JUST UNDER CARRIER
ENCODER OUTPUT ?
<L0+P3
≧L0+P3
DOWN HAND
ENCODER OUTPUT ?
<L0+P4
≧L0+P4
DECELERATE HAND
B
ENCODER OUTPUT ?
<L0+P1
≧L0+P1
START UNLOADING MOTION : UP HAND
ENCODER OUTPUT ?
<L0+P5
≧L0+P5
DECELERATE HAND JUST UNDER CARRIER
ENCODER OUTPUT ?
<L0+P6
≧L0+P6
DOWN HAND
ENCODER OUTPUT ?
<L0+P7
≧L0+P7
DECELERATE HAND
RESET HAND
END