Fig.1

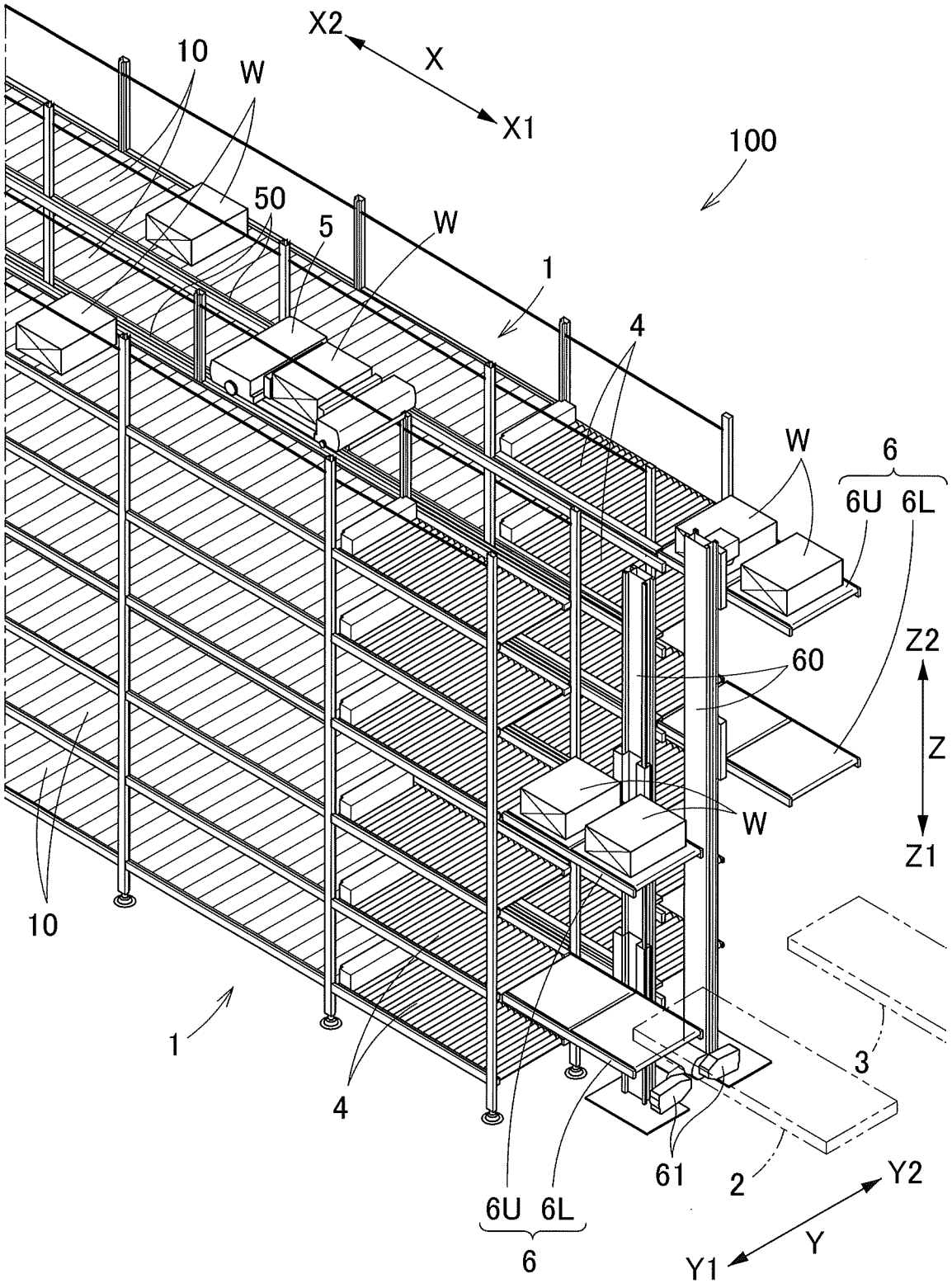


Fig.2

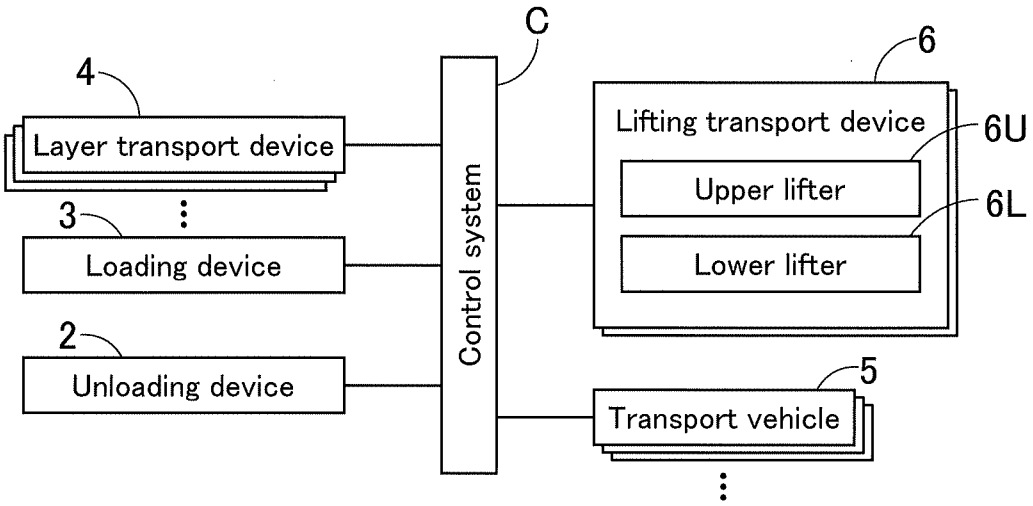

C
4
Layer transport device
3
Loading device
2
Unloading device
Control system
6
Lifting transport device
6U
Upper lifter
6L
Lower lifter
5
Transport vehicle

Fig.3

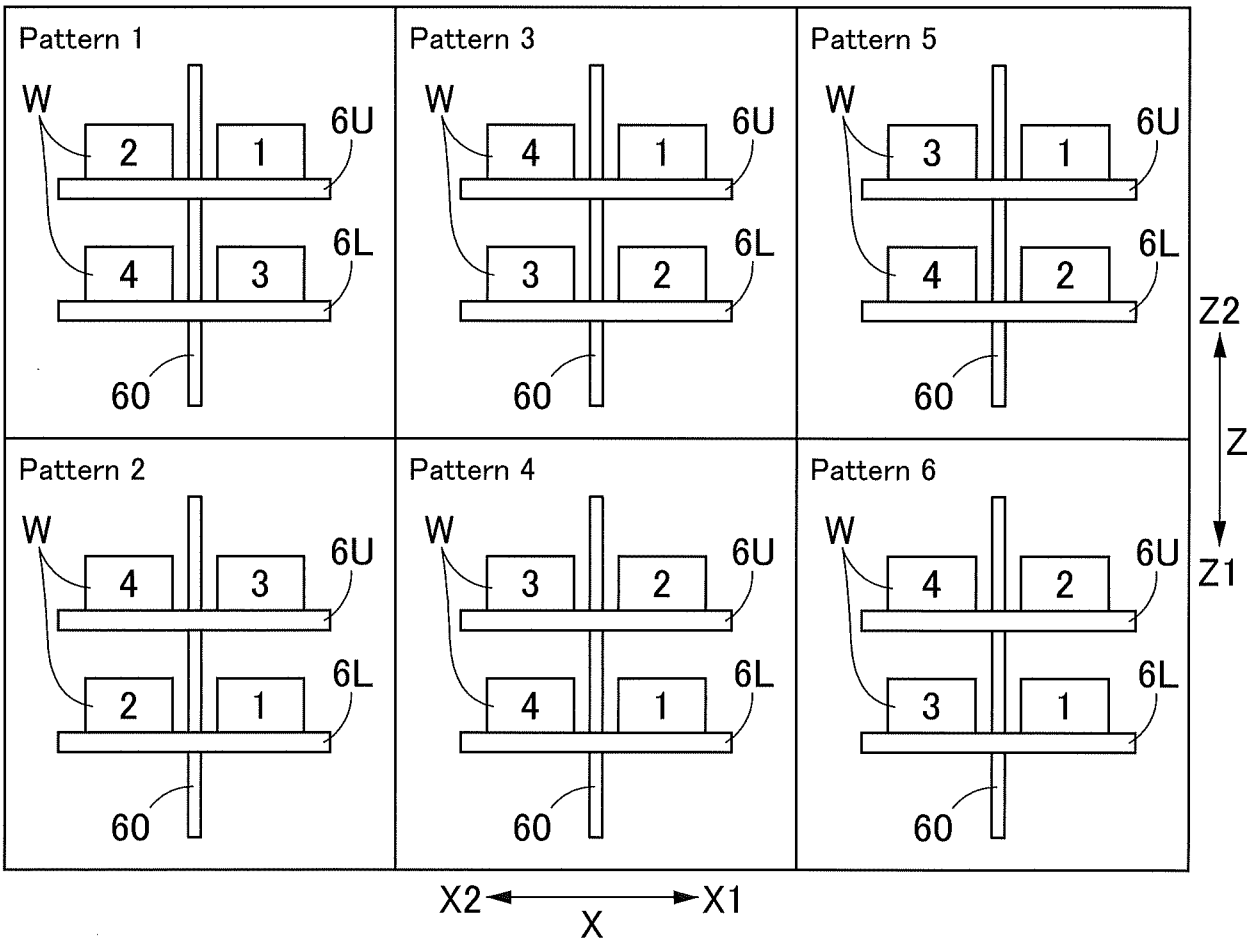

Pattern 1
Pattern 3
Pattern 5
Pattern 2
Pattern 4
Pattern 6
W
6U
6L
60
Z2
Z
Z1
X2
X
X1

Fig.4

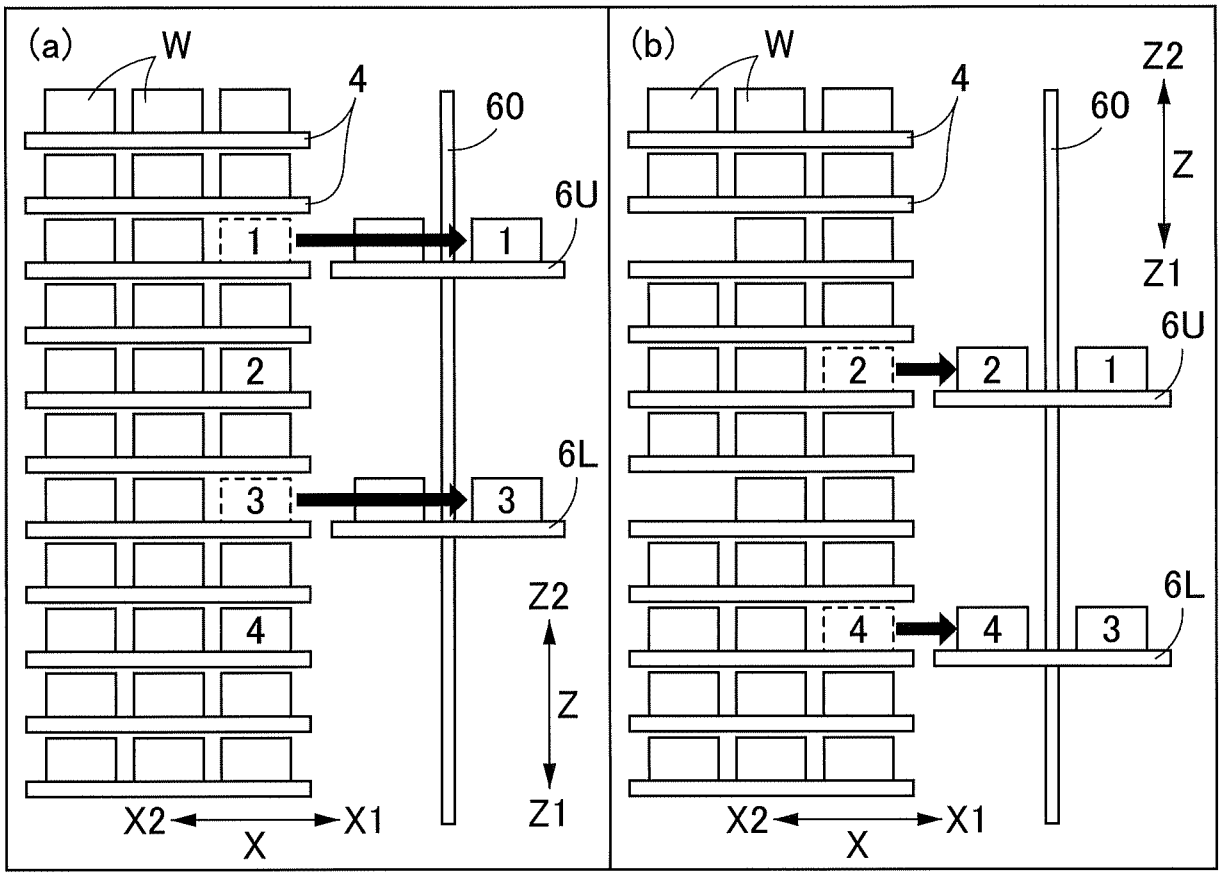

(a)
W
4
60
6U
1
1
2
3
6L
3
4
Z2
Z
Z1
X2
X1
X
(b)
W
4
60
Z2
Z
Z1
6U
2
2
1
6L
4
4
3
X2
X1
X

Fig.5

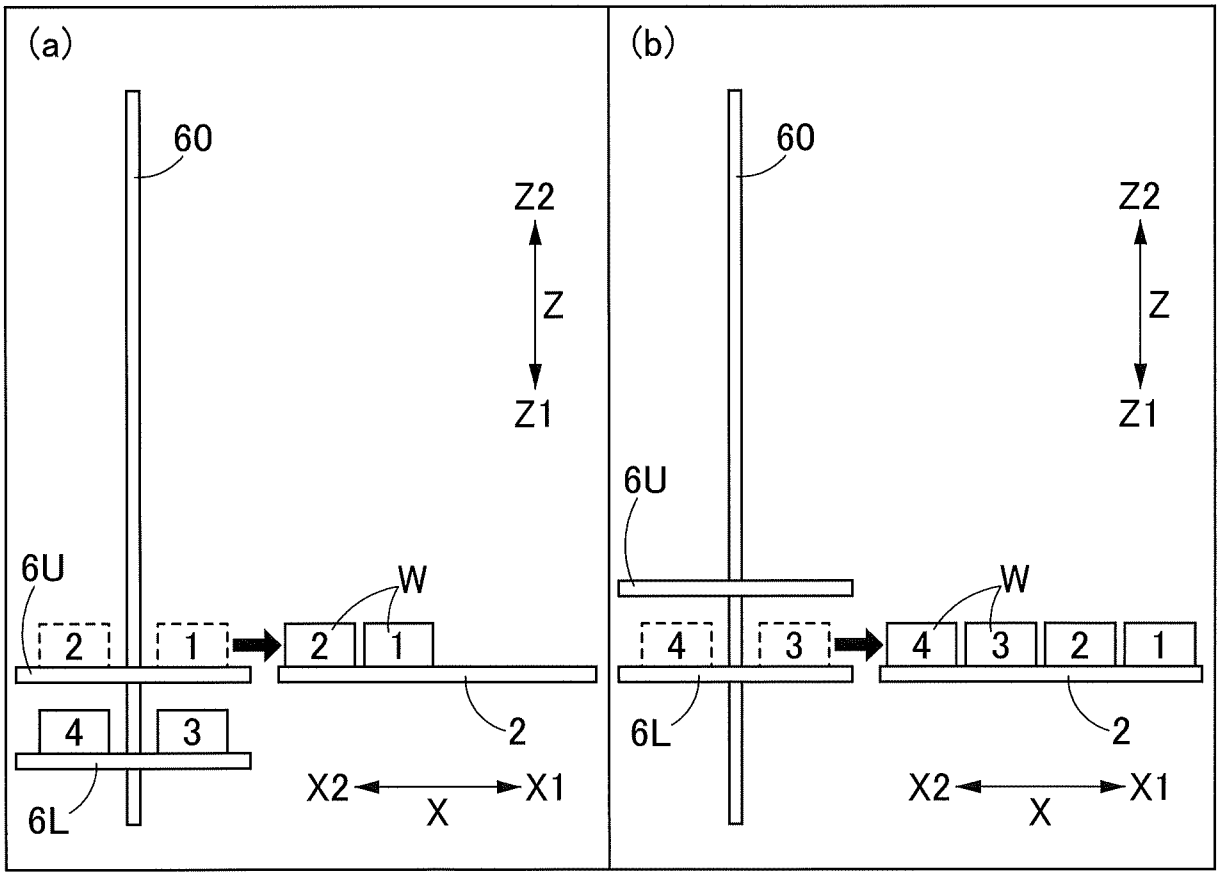

(a)
60
Z2
Z
Z1
6U
W
2
1
2
1
4
3
2
6L
X2
X1
X
(b)
60
Z2
Z
Z1
6U
W
4
3
4
3
2
1
6L
2
X2
X1
X

Fig.6

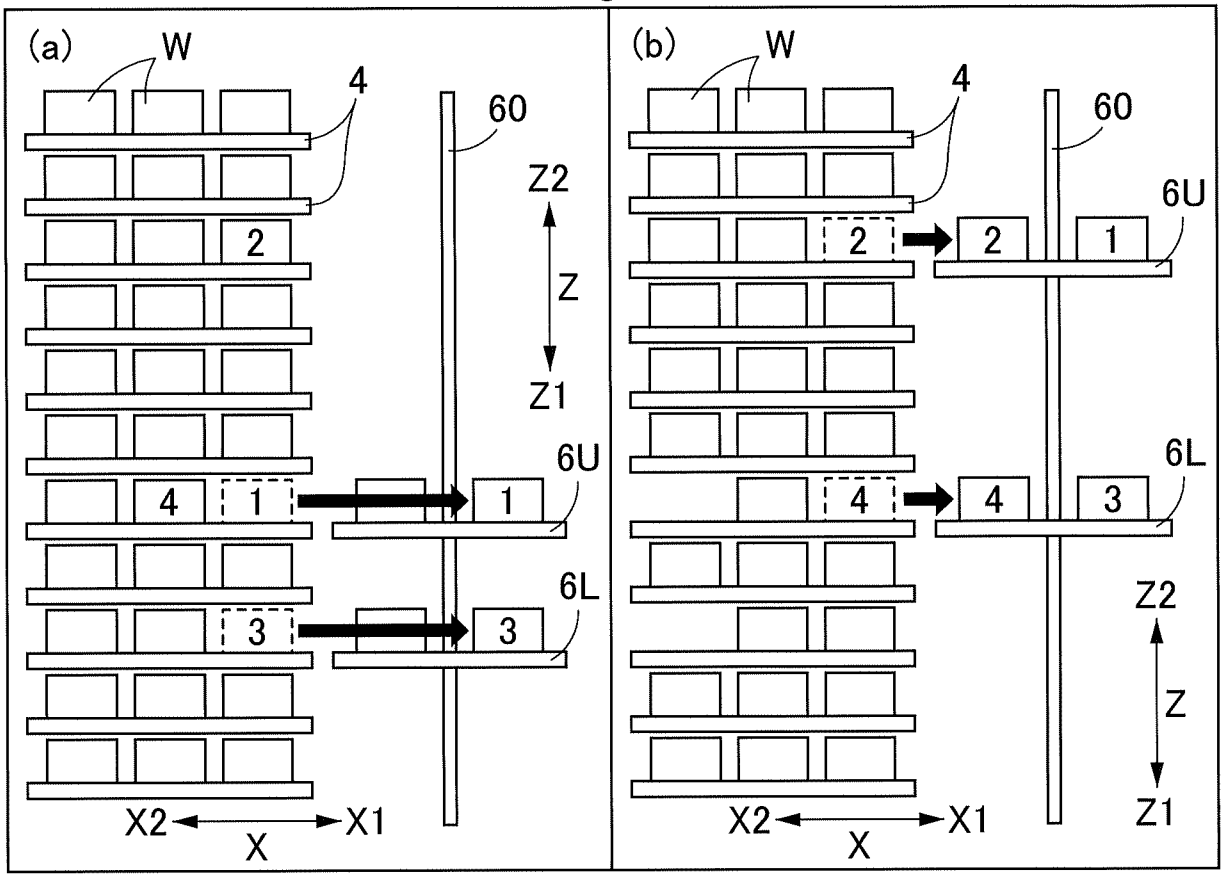

(a)
W
4
60
Z2
Z
Z1
2
6U
4
1
1
6L
3
3
X2
X1
X
(b)
W
4
60
6U
2
2
1
6L
4
4
3
Z2
Z
Z1
X2
X1
X

Fig.7

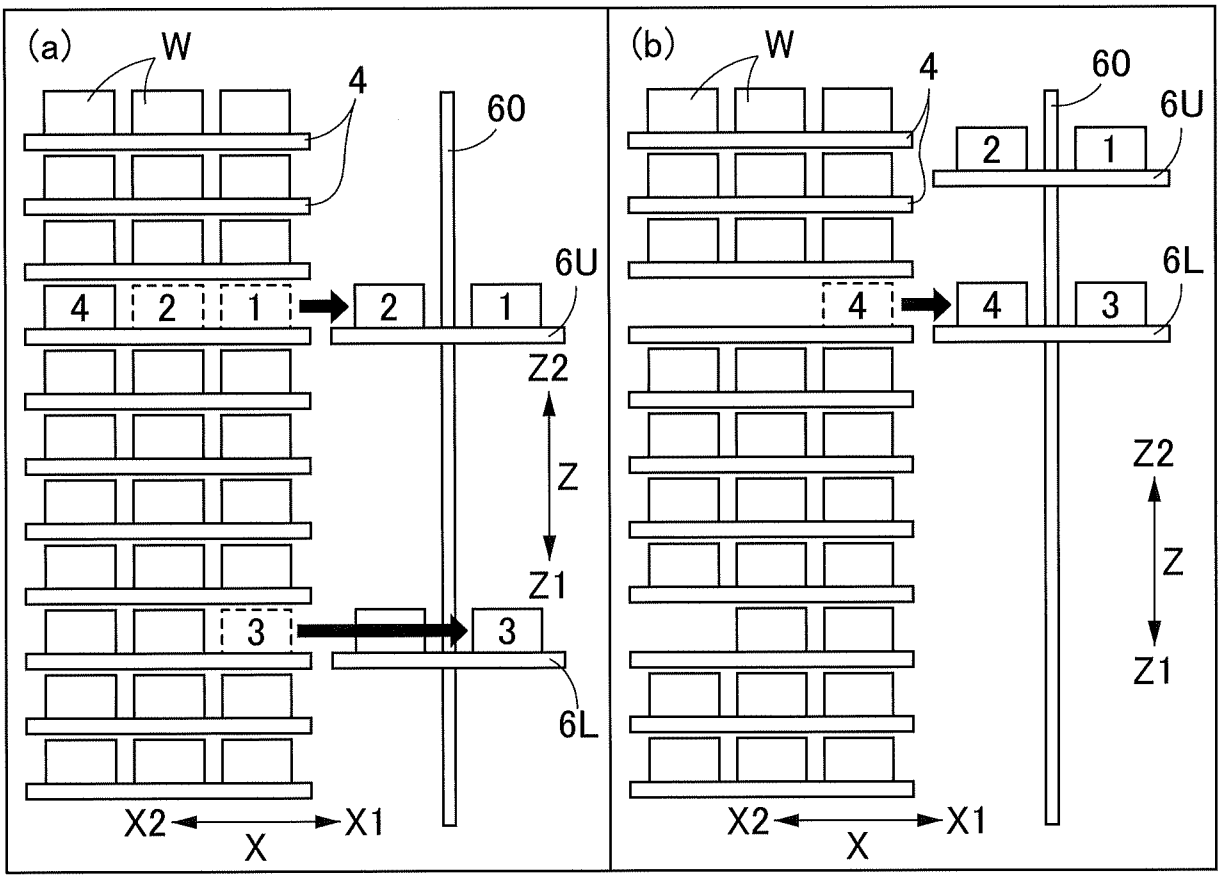

(a)
W
4
60
6U
4
2
1
2
1
Z2
Z
Z1
3
3
6L
X2
X1
X
(b)
W
4
60
6U
2
1
6L
4
4
3
Z2
Z
Z1
X2
X1
X

Fig.8

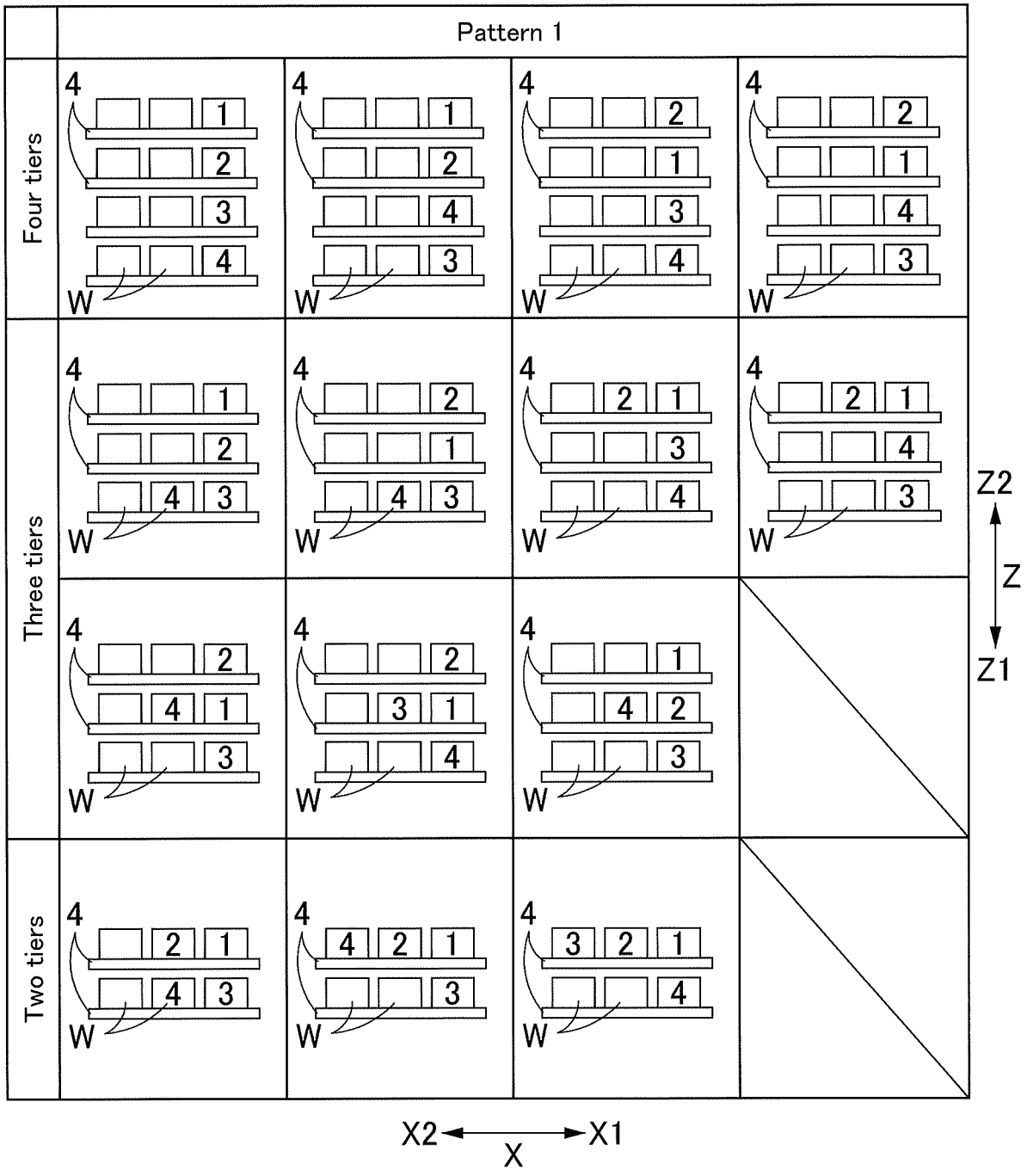


Fig.9

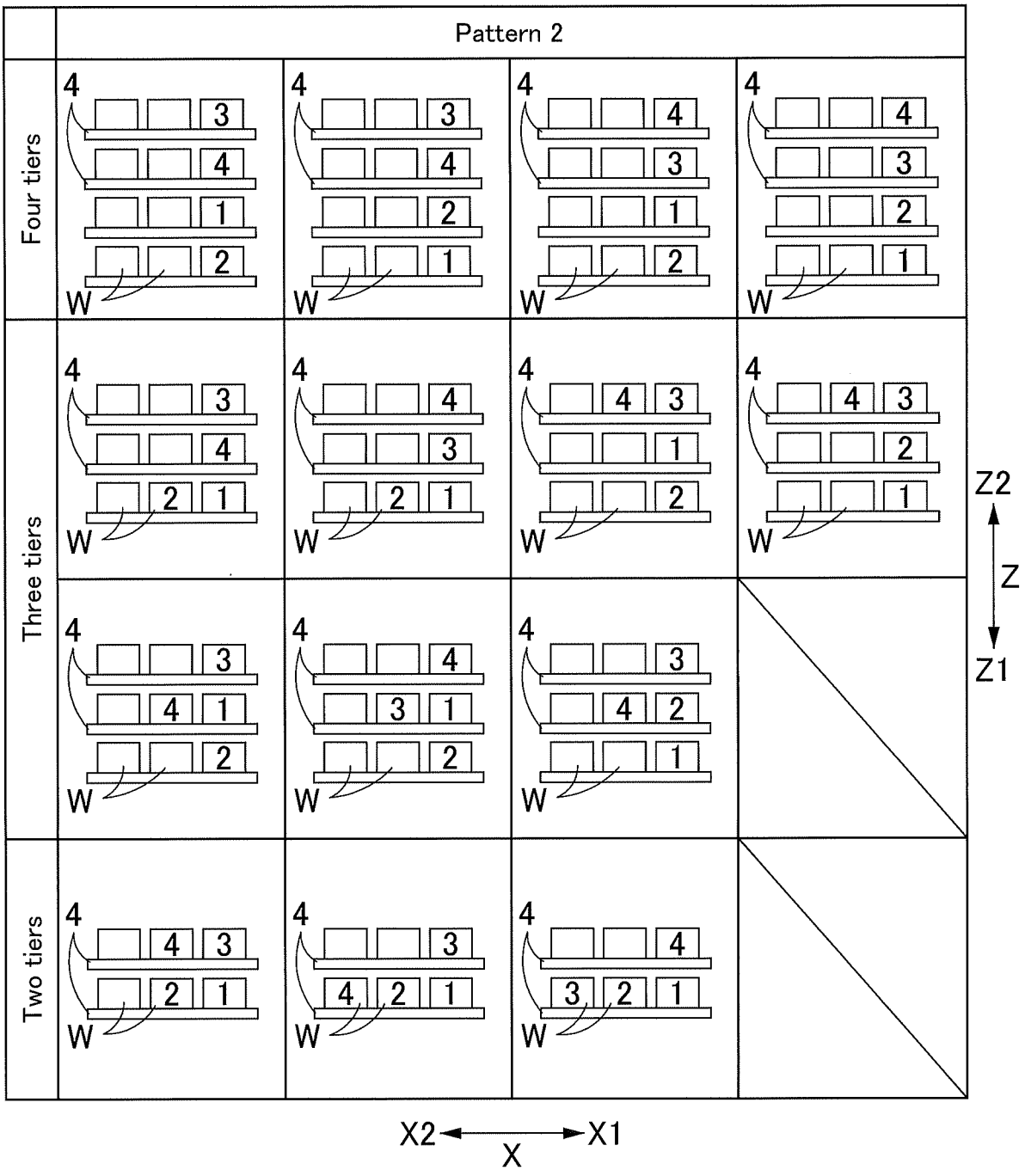


Fig.10

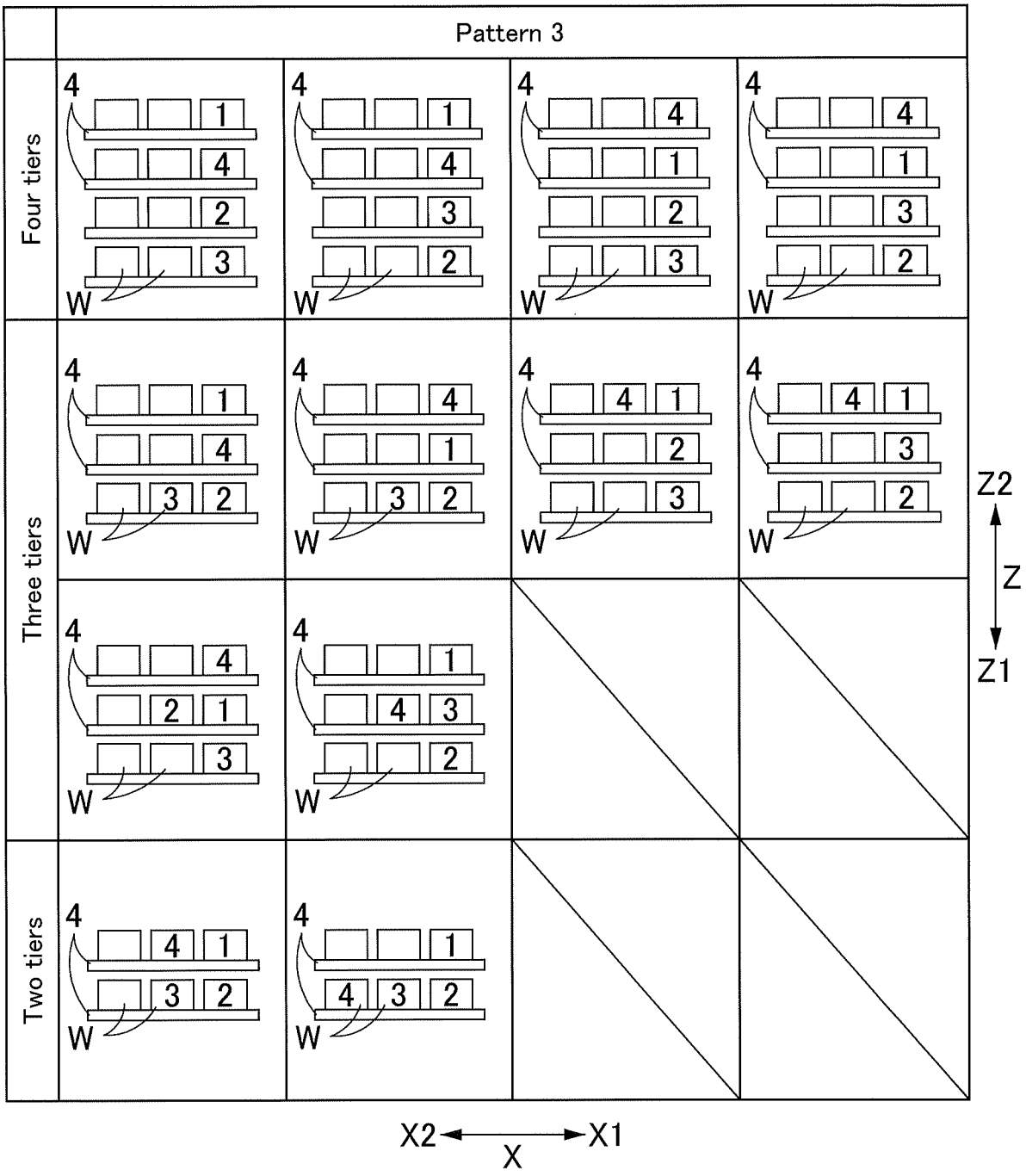


Fig.11

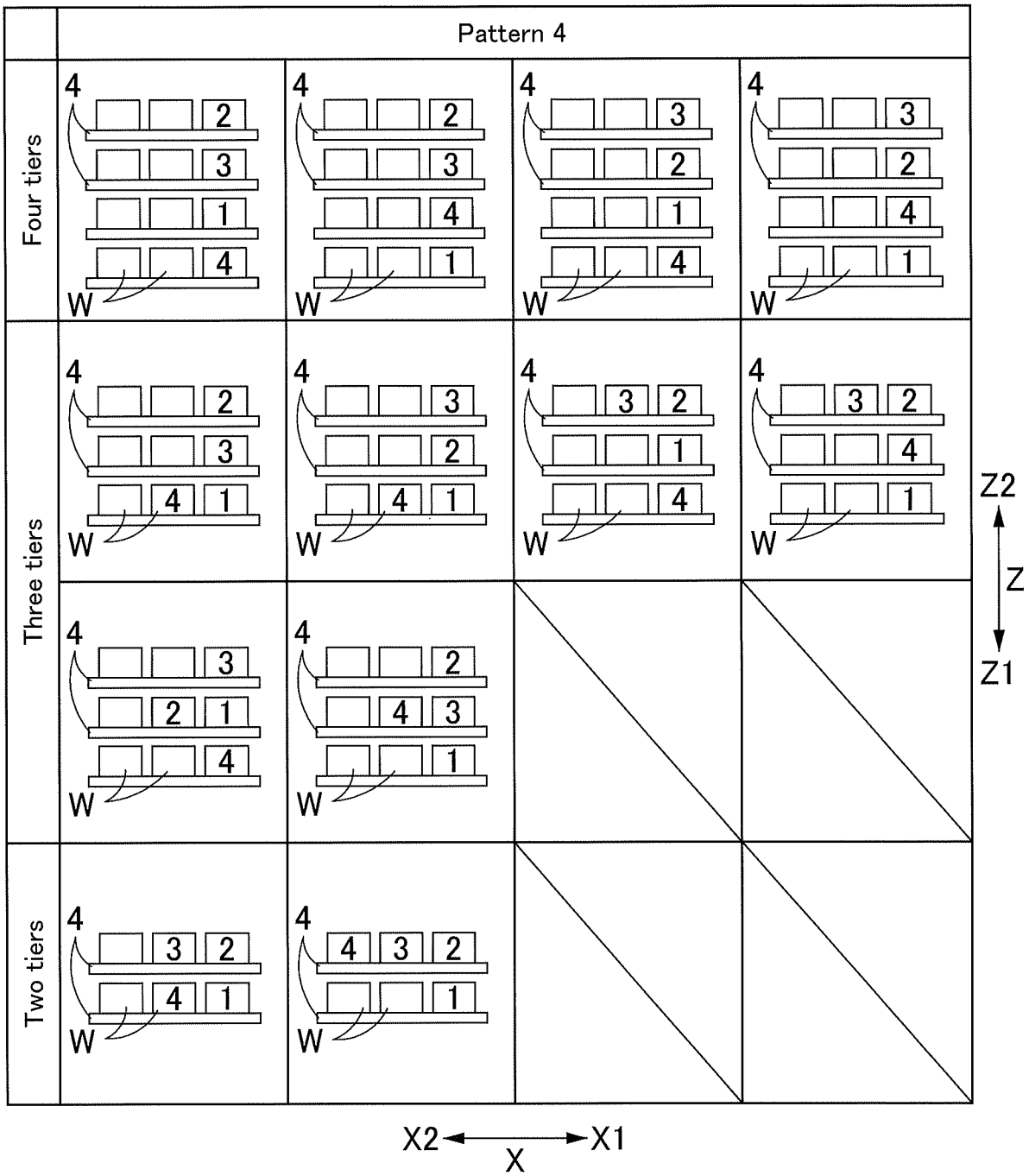


Fig.12

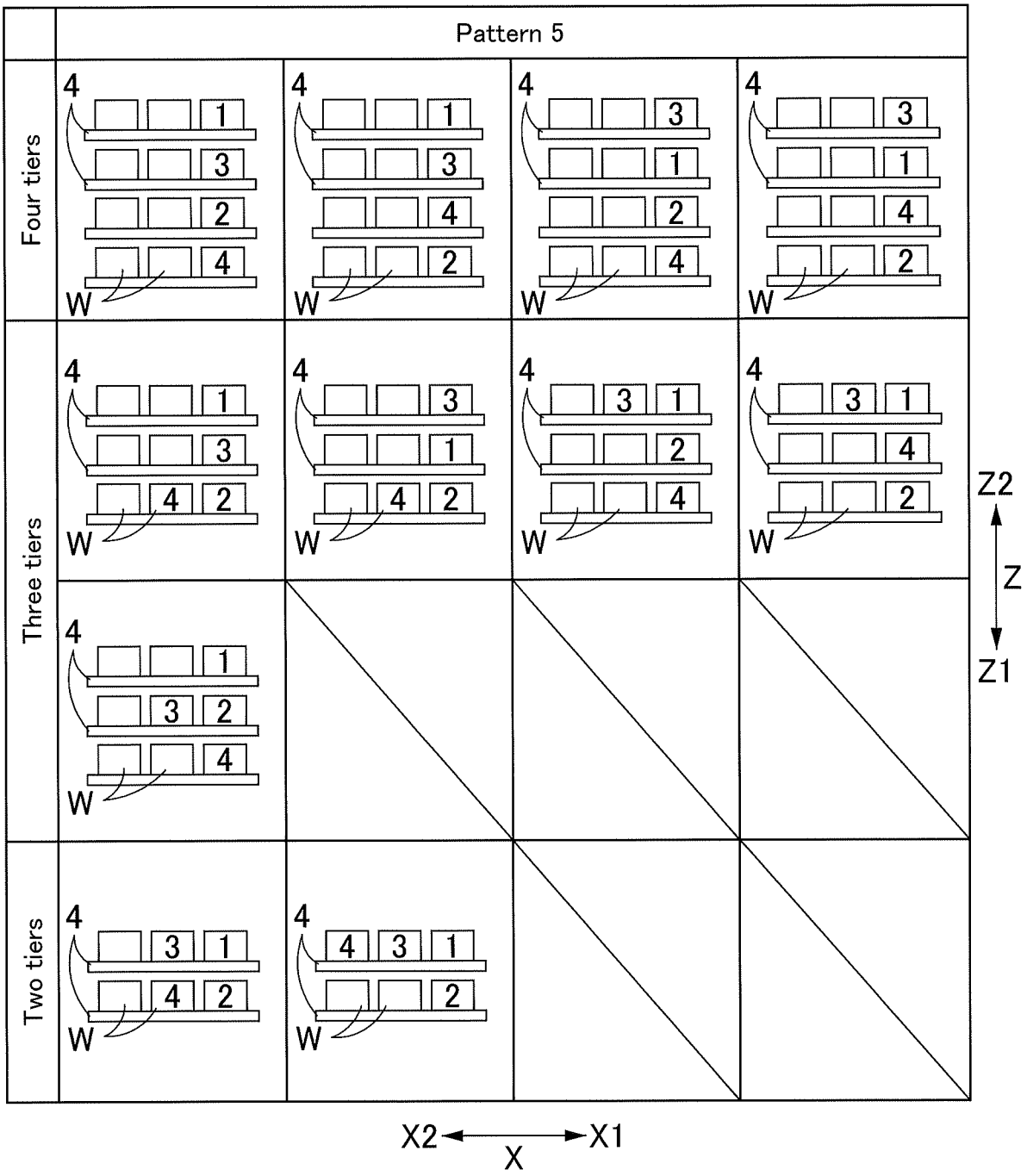

Pattern 5
Four tiers
Three tiers
Two tiers
4
W
1
3
2
4
3
1
2
4
4
3
1
2
4
4
3
1
2
4
4
3
1
2
4
4
3
1
2
4
4
3
1
2
4
4
3
1
2
4
4
3
1
2
4
4
3
1
2
4
Z2
Z
Z1
X2
X
X1

Fig.13

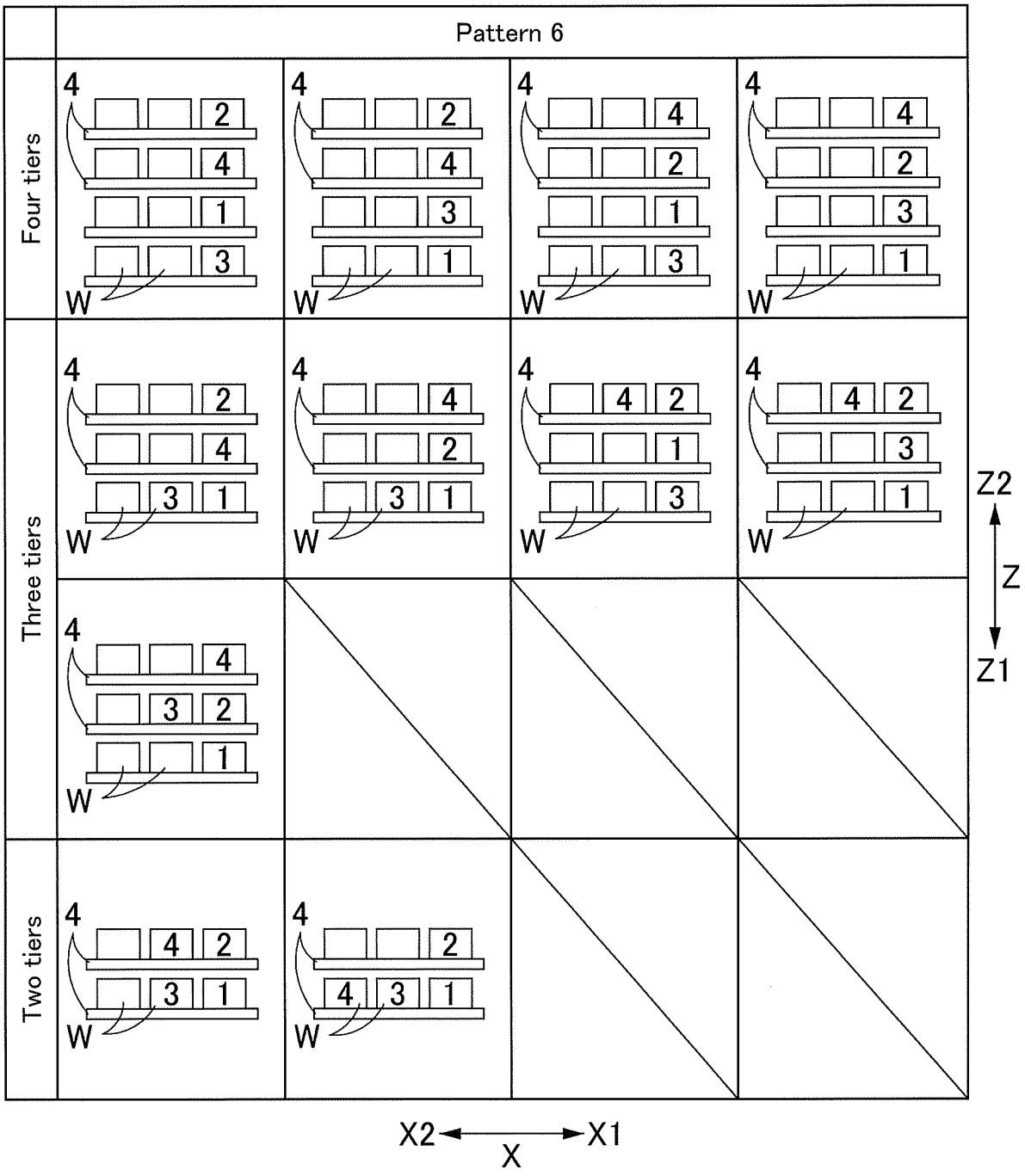


Fig.14

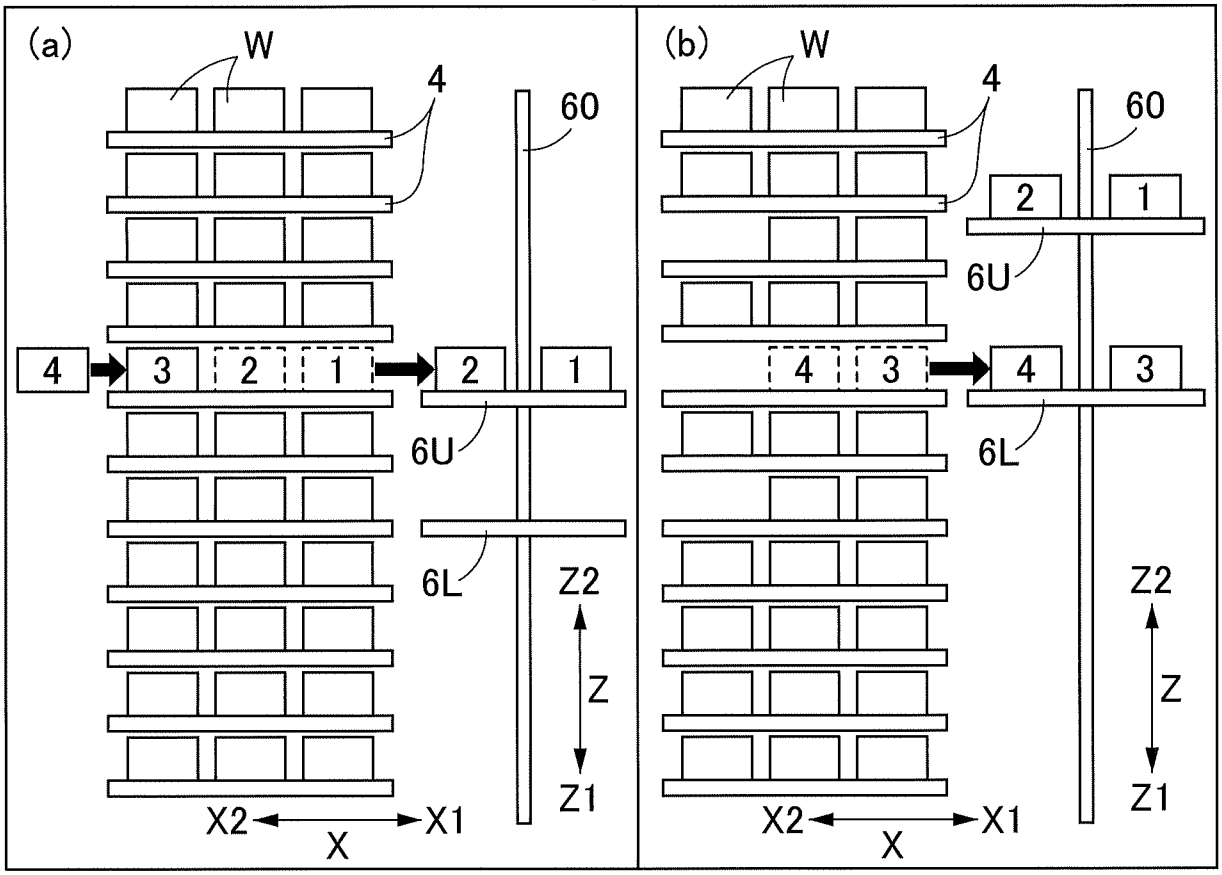

(a)
W
4
60
4
3
2
1
2
1
6U
6L
Z2
Z
Z1
X2
X
X1
(b)
W
4
60
2
1
6U
4
3
4
3
6L
Z2
Z
Z1
X2
X
X1

Fig.15

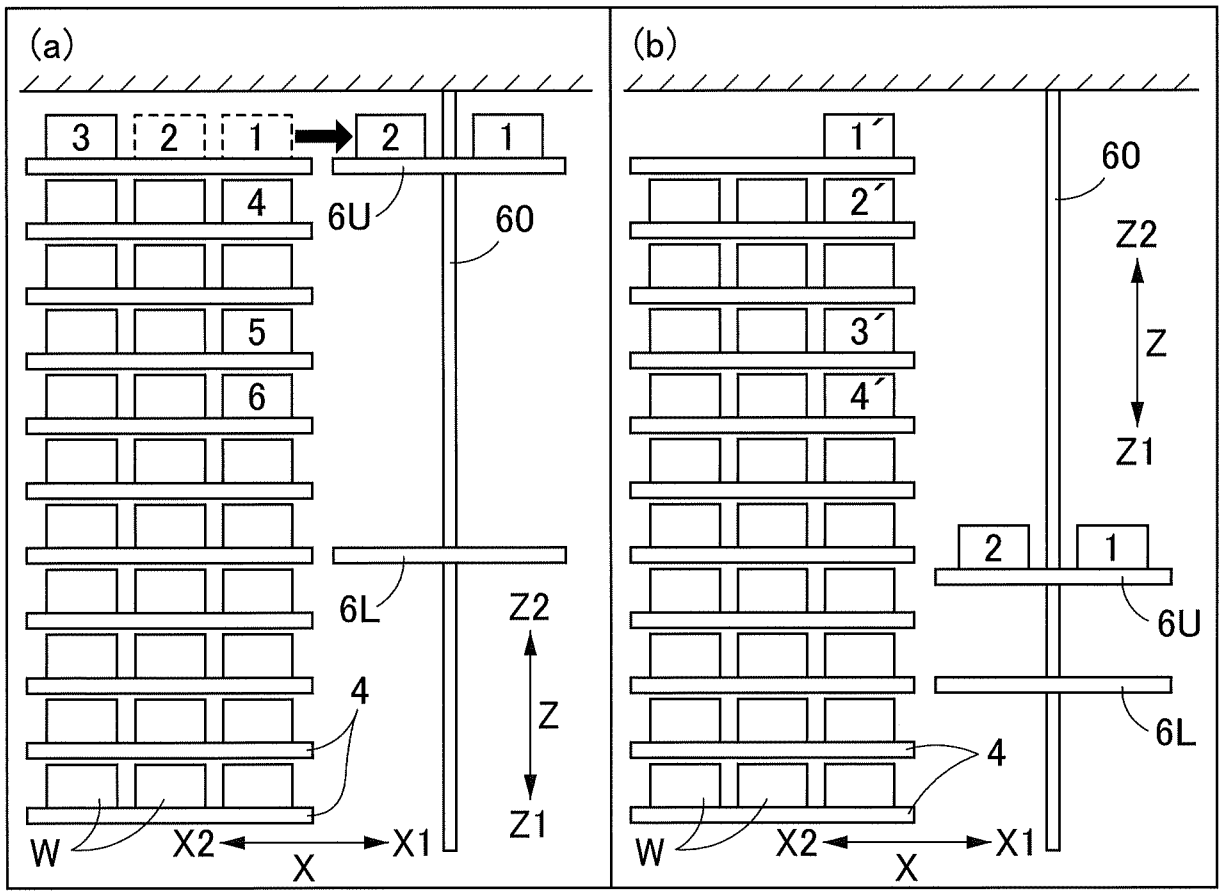

(a)
3
2
1
2
1
4
6U
60
5
6
6L
Z2
Z
Z1
4
W
X2
X
X1
(b)
1´
60
2´
Z2
Z
3´
4´
Z1
2
1
6U
6L
4
W
X2
X
X1

Fig.16

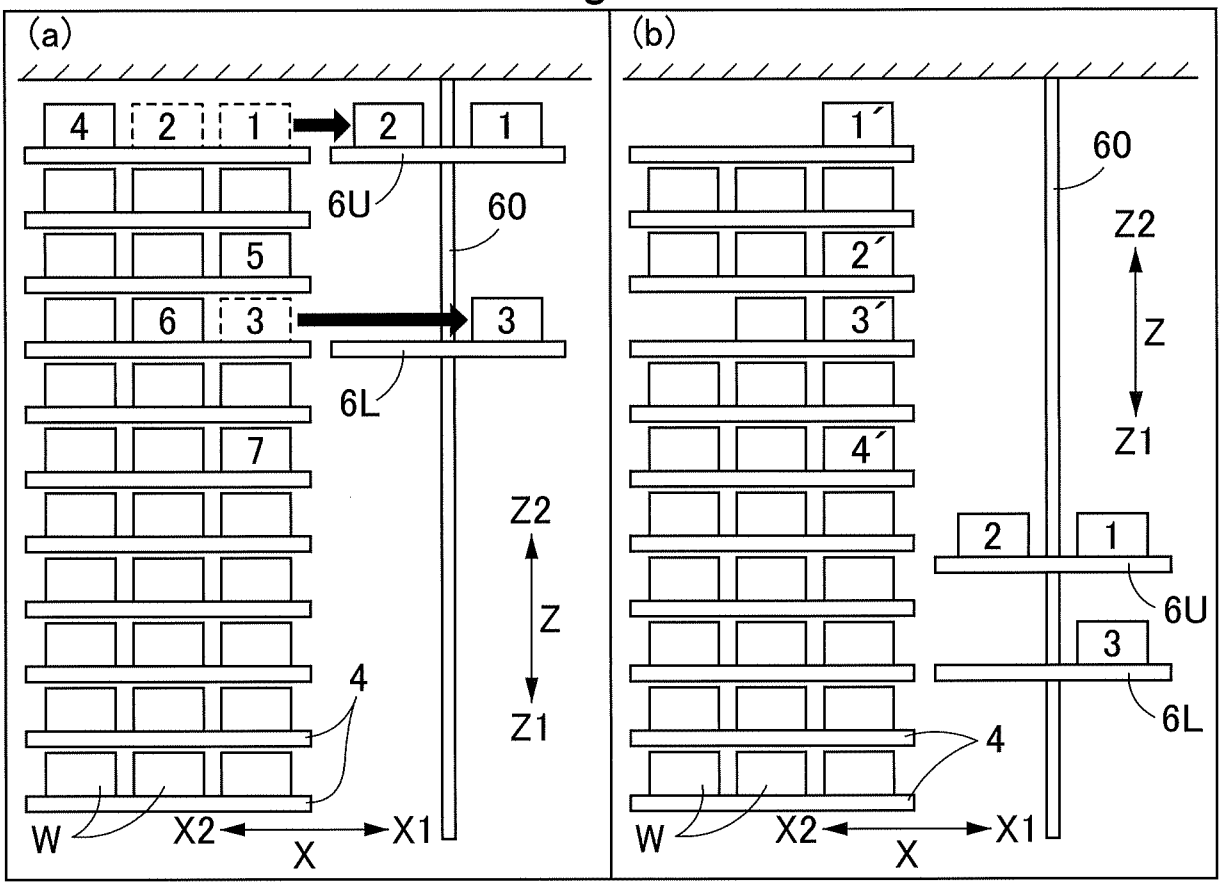
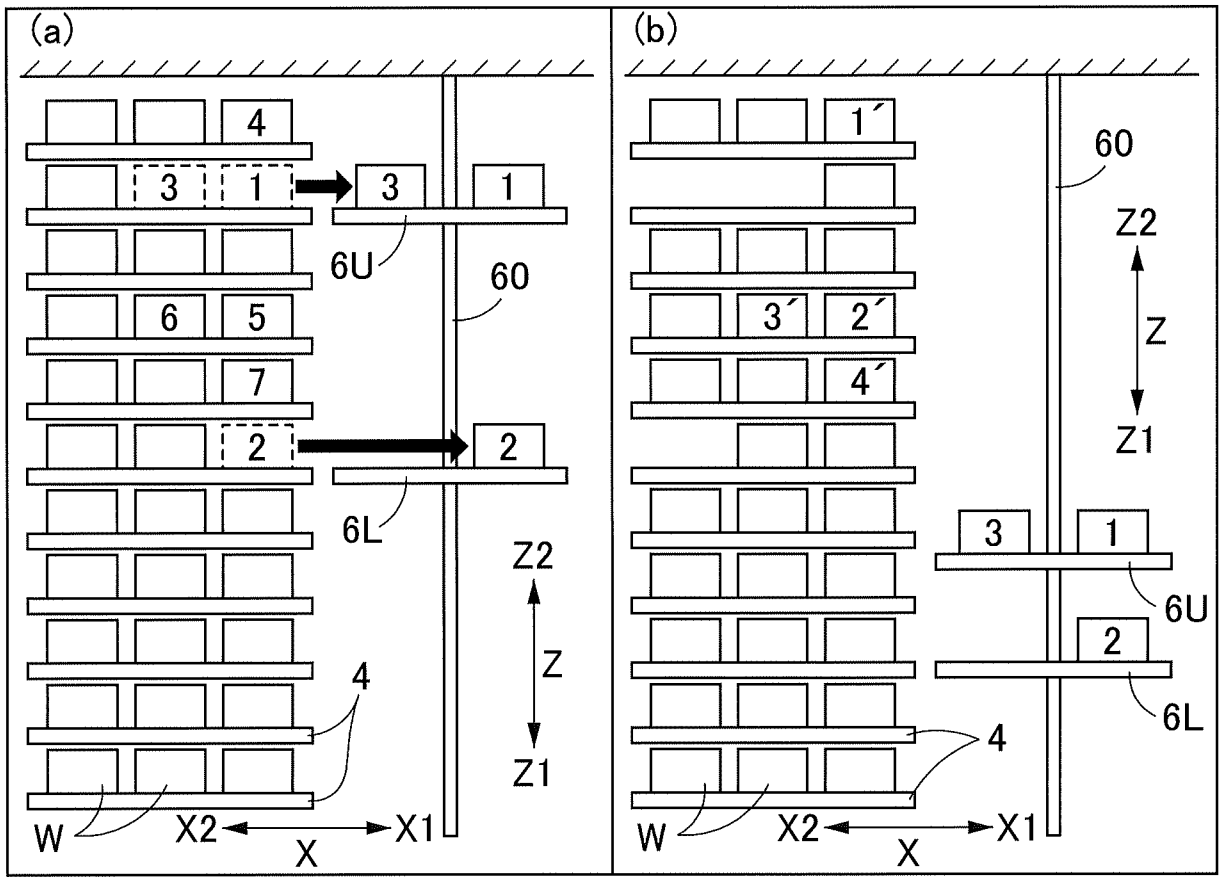

(a)
(b)
4
2
1
2
1
6U
60
5
6
3
3
6L
7
Z2
Z
Z1
4
W
X2
X
X1
1´
2´
3´
4´

Fig.17


(a)
(b)
4
3
1
3
1
6U
60
6
5
7
2
2
6L
Z2
Z
Z1
4
W
X2
X
X1
1´
2´
3´
4´