

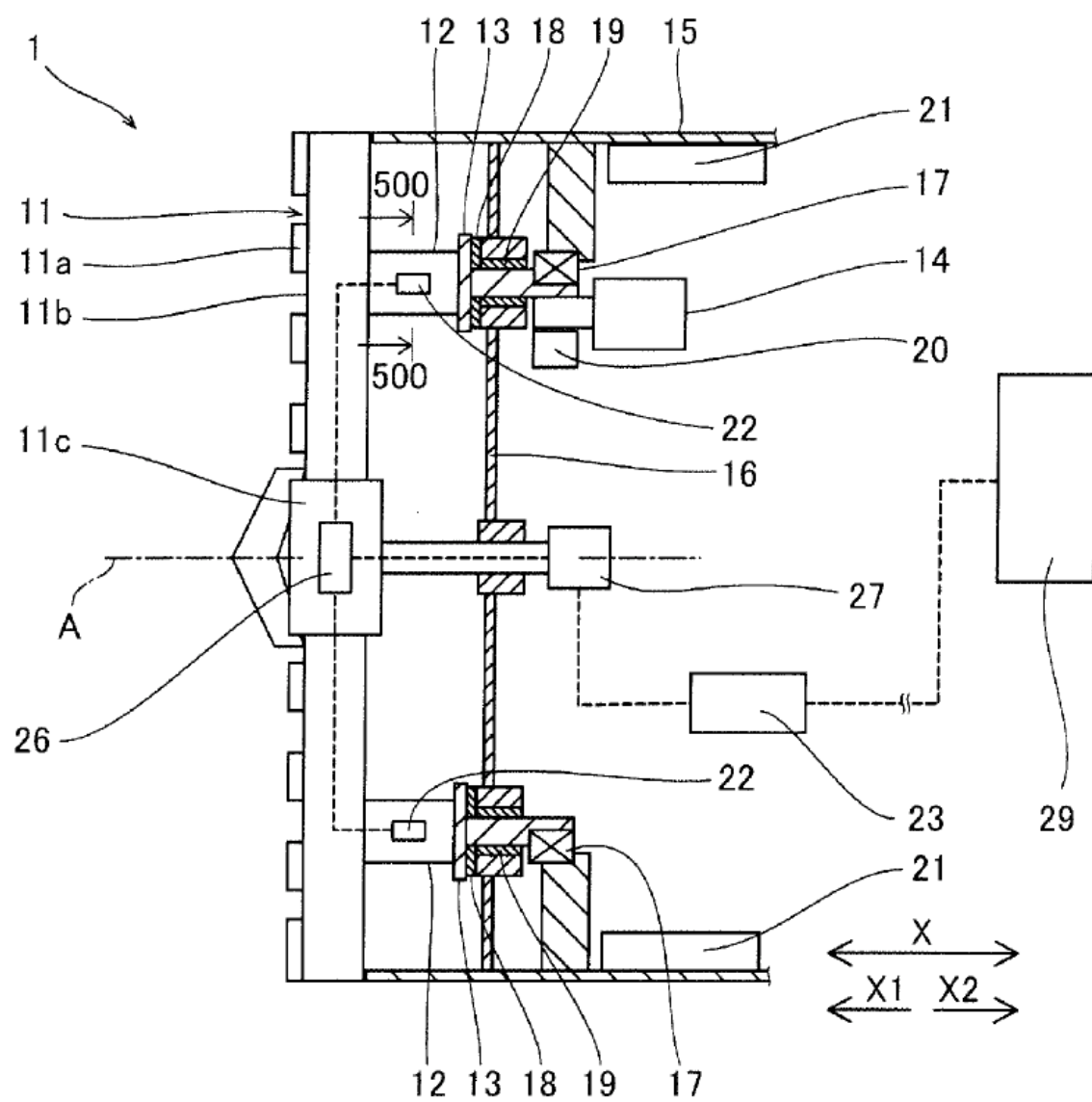


Fig. 1

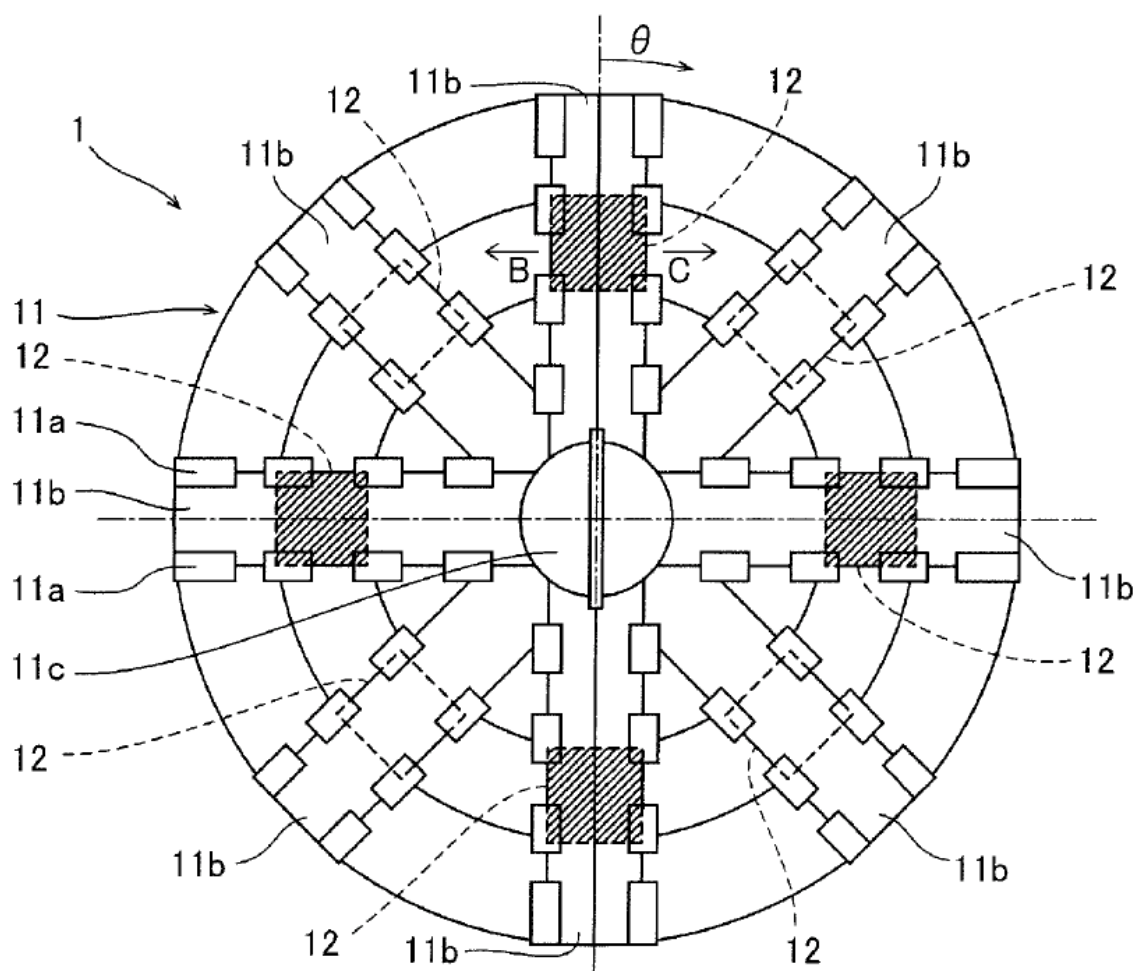


Fig. 2

Fig. 3

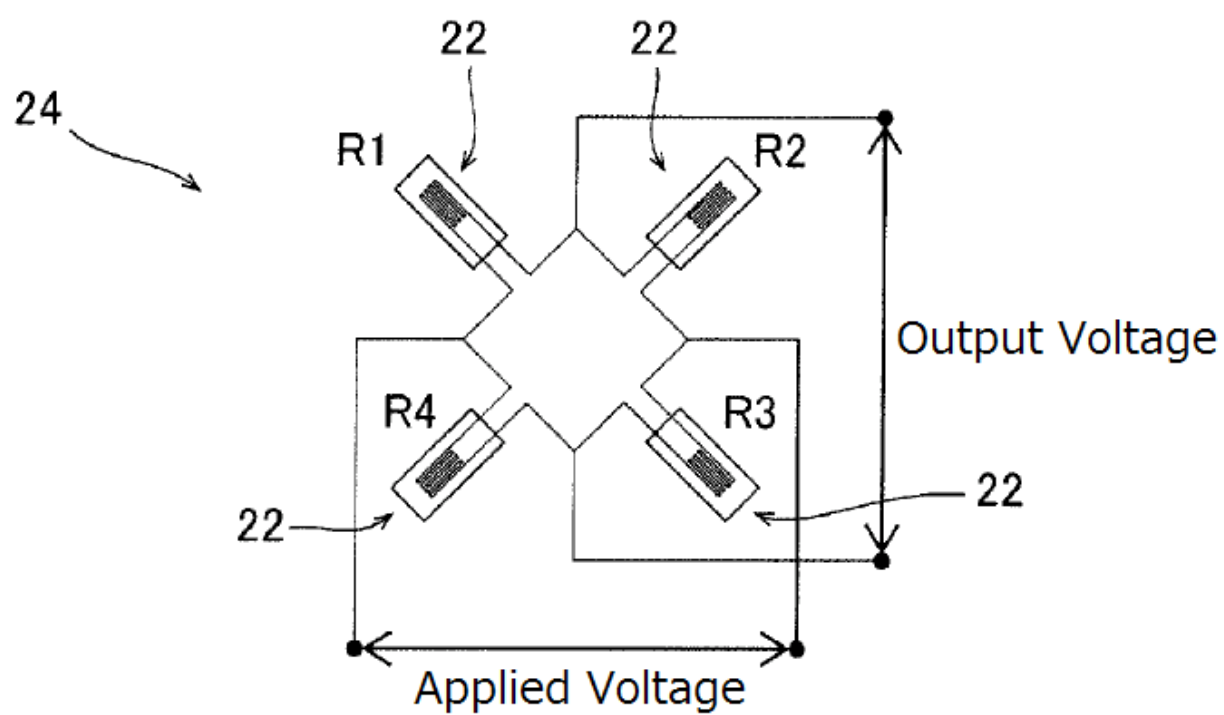


Fig. 4

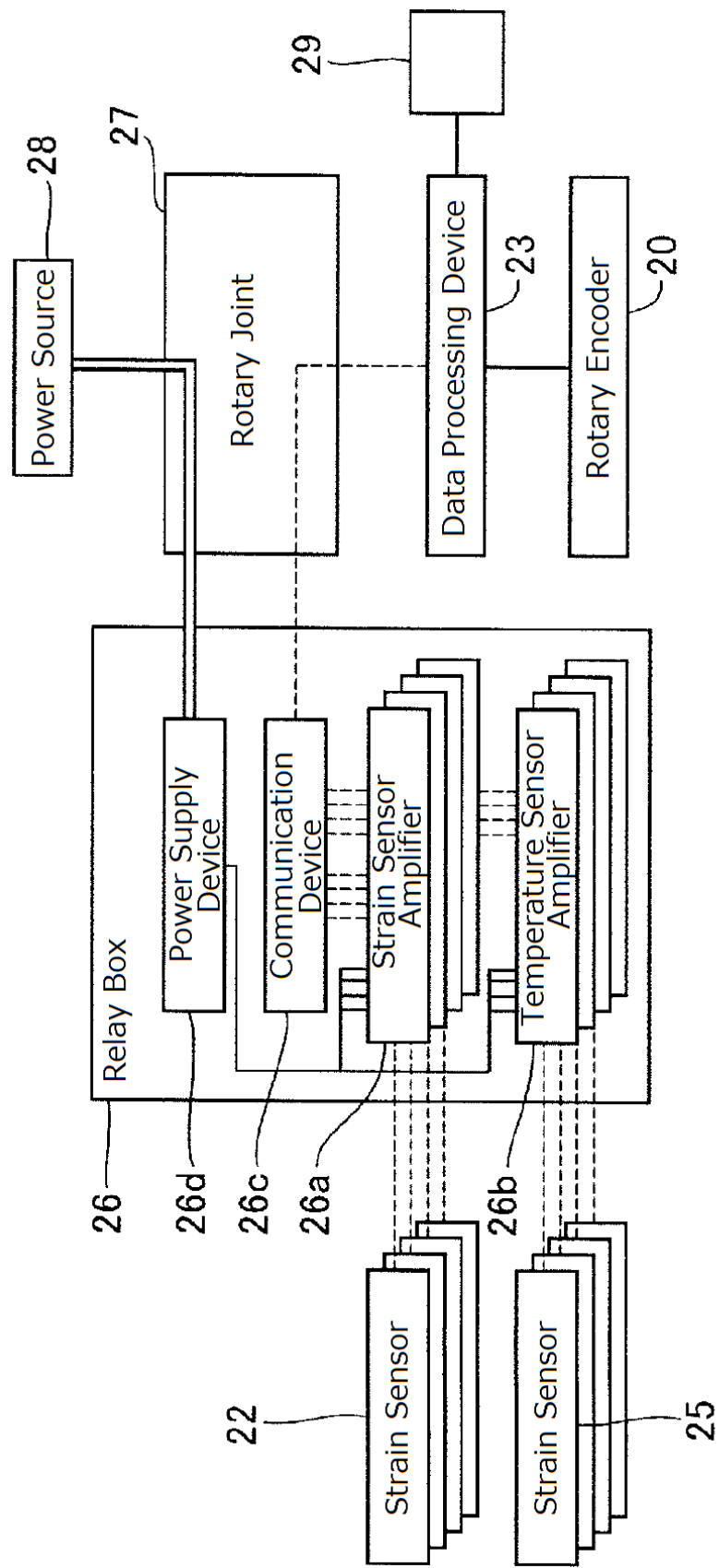


Fig. 5

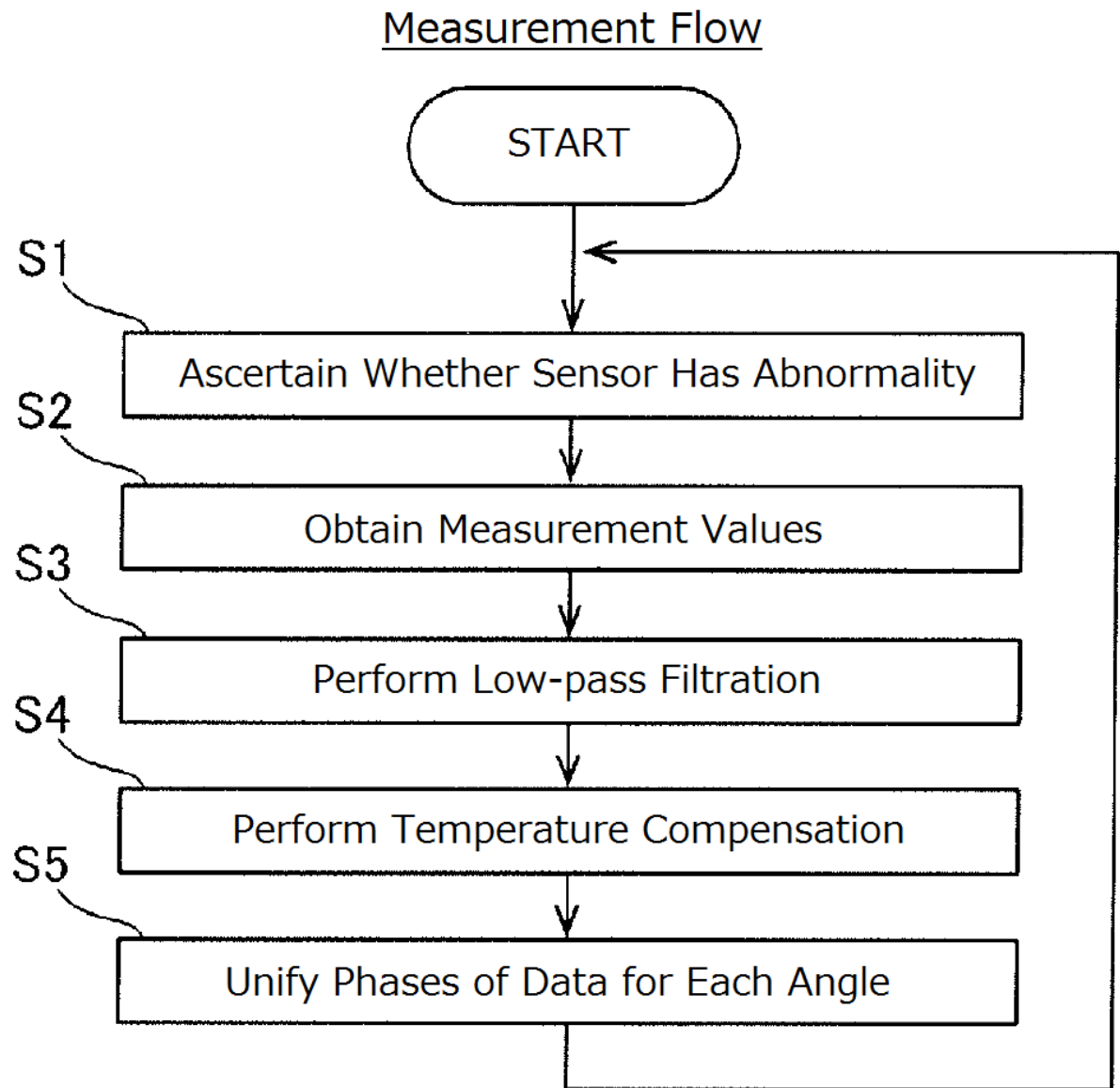


Fig. 6

Operation Flow

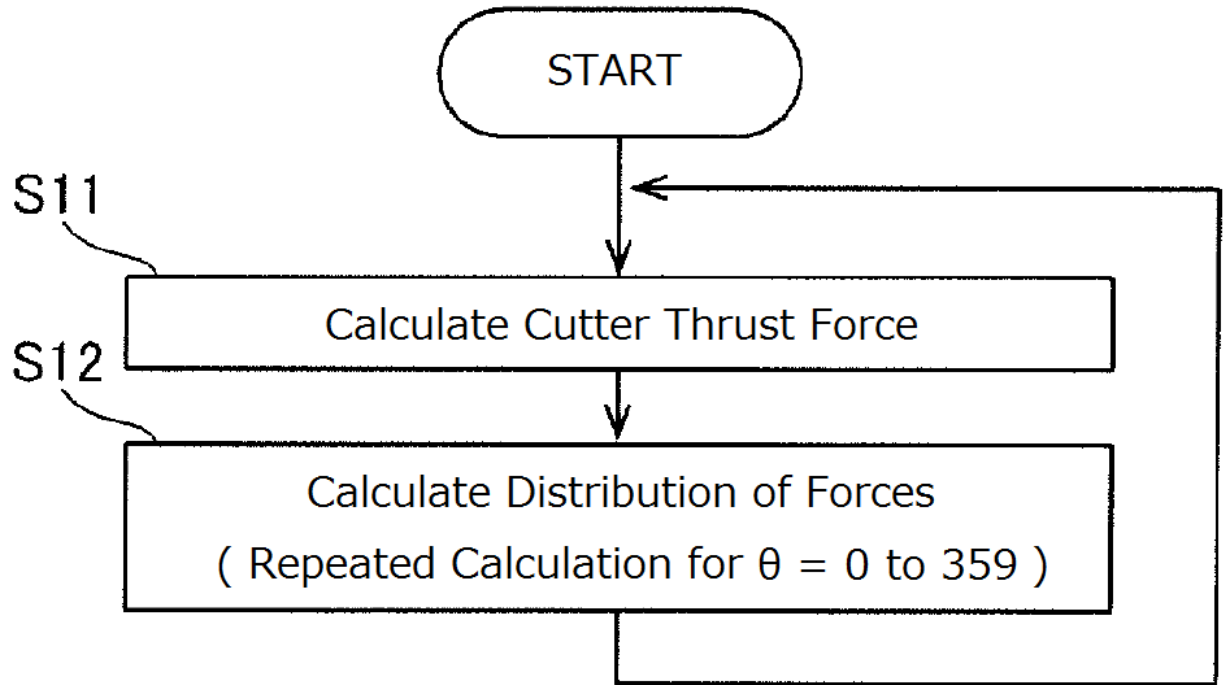


Fig. 7

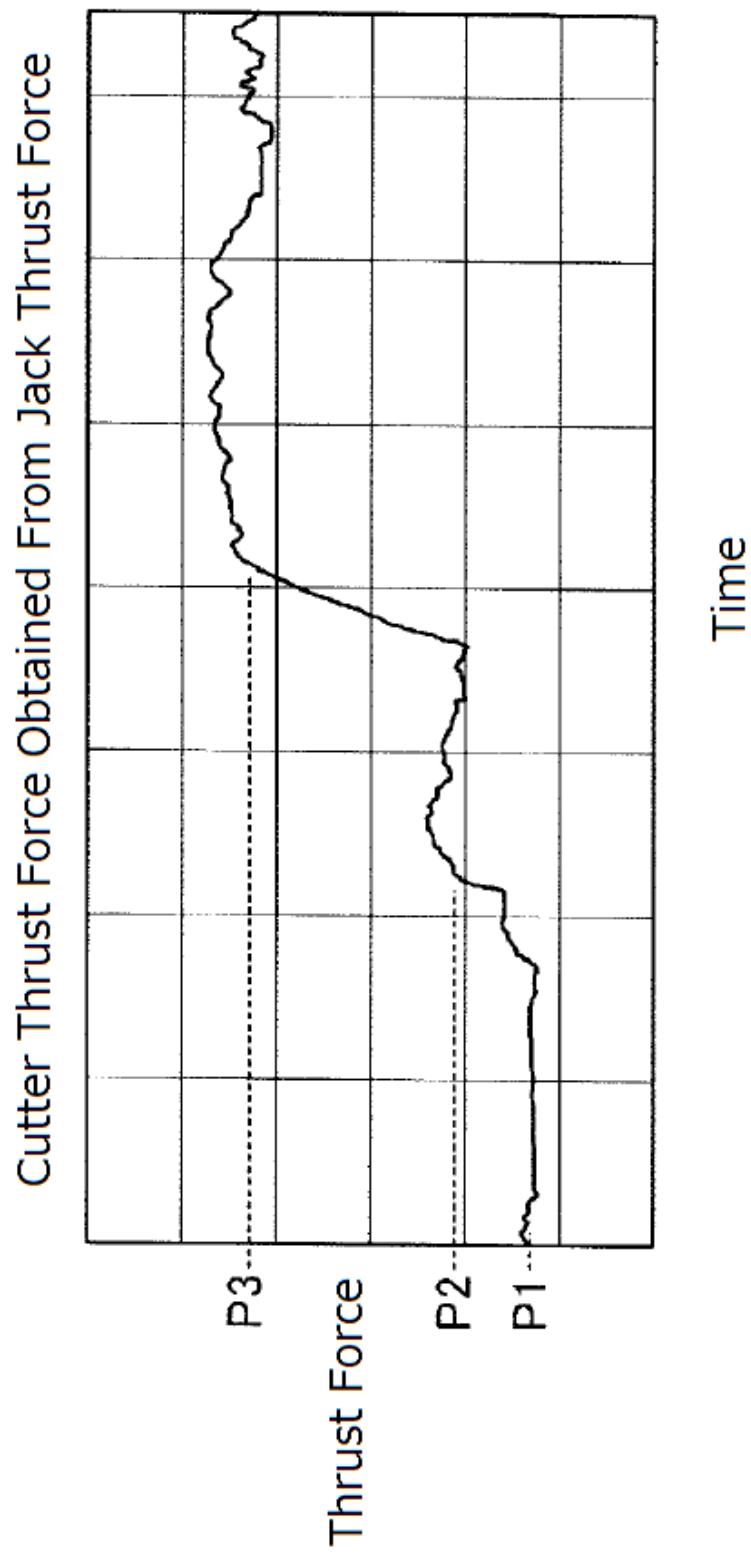


Fig. 8

Average of Compressive Strain of
Cutter Columns (at four locations)

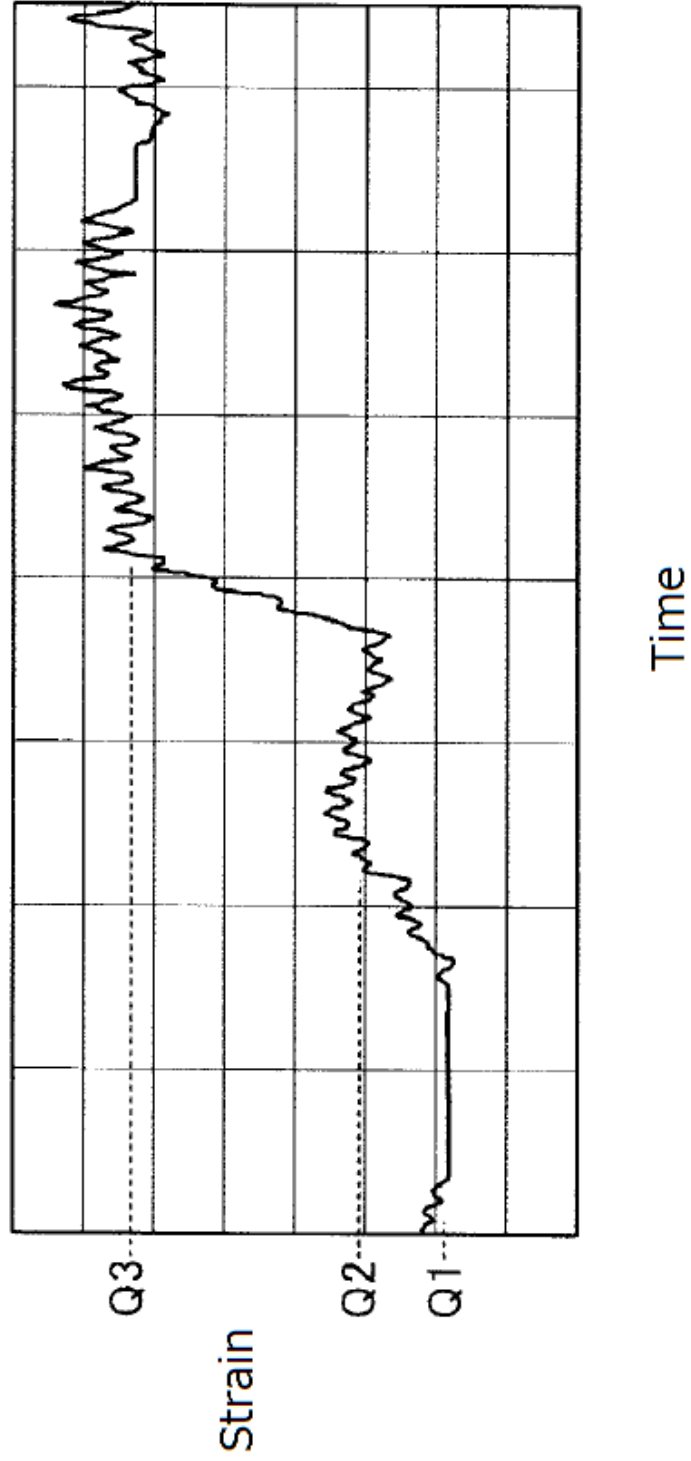


Fig. 9

Relationship between Cutter Thrust Force and Compressive Strain of Cutter Columns

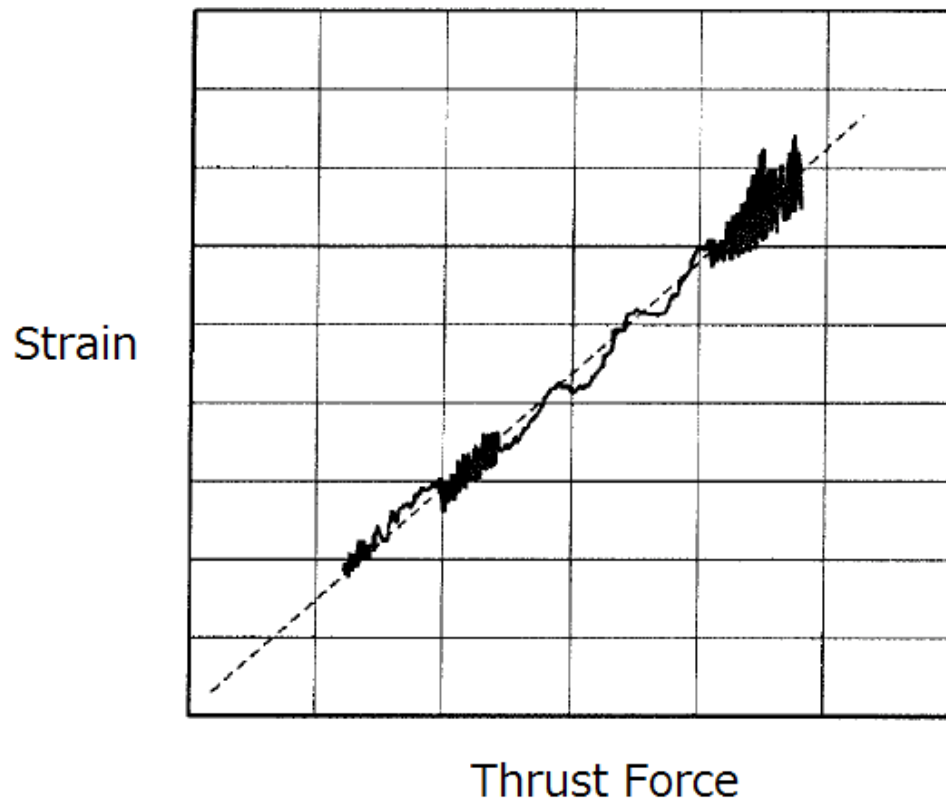


Fig. 10

Radar Chart of Compressive Strain of Cutter Columns

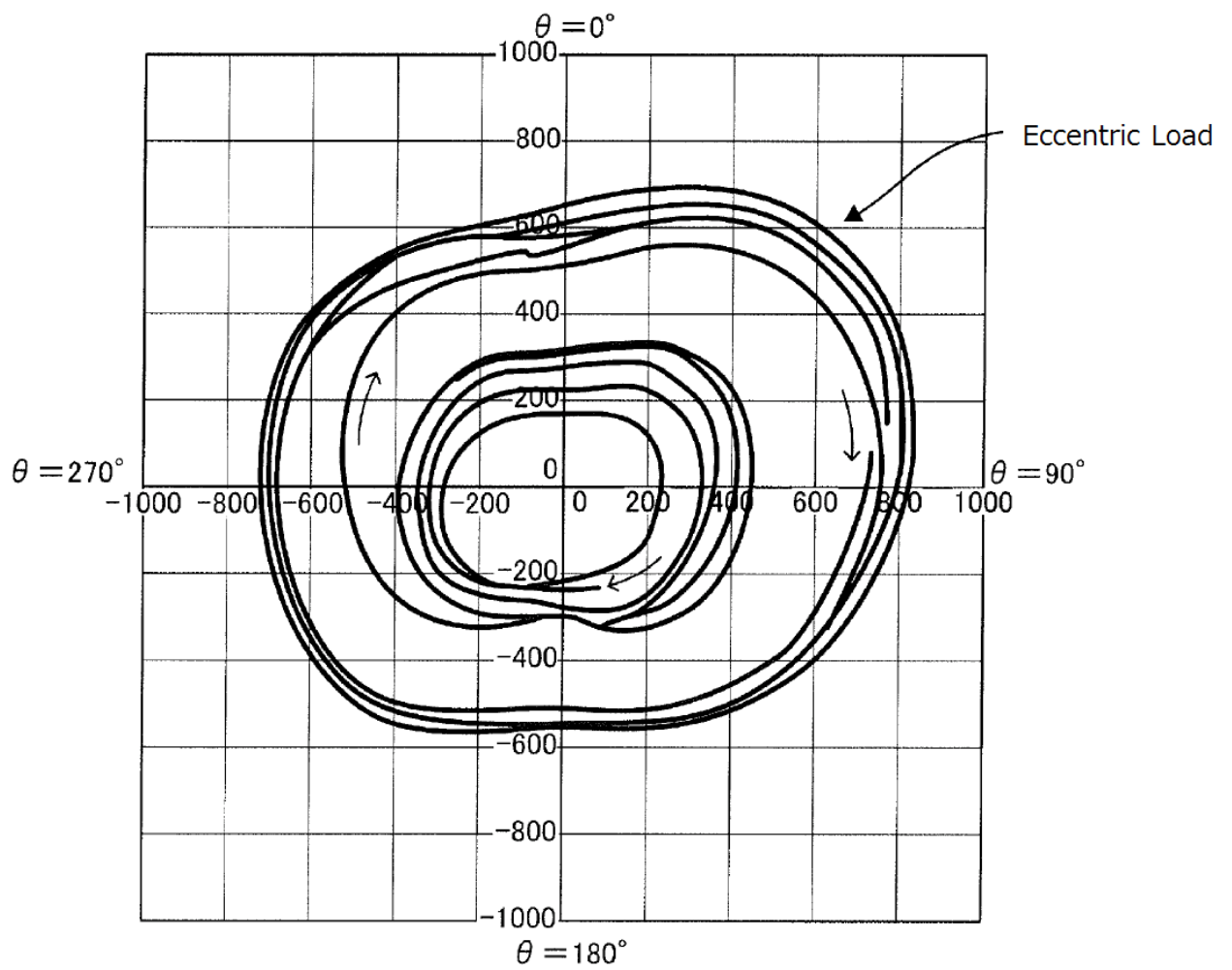


Fig. 11

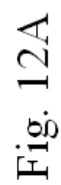


Fig. 13A

Fig. 10 is a cross-sectional view of a second embodiment of the device. It shows a central assembly with multiple layers and components labeled 111, 11a, 11b, 11c, 114, 14, 17, 20, 22, 26, 27, 123, and 15. The assembly is mounted on a base 15. Dimensions X, X1, and X2 are indicated at the bottom right.

Fig. 13A

Third Embodiment

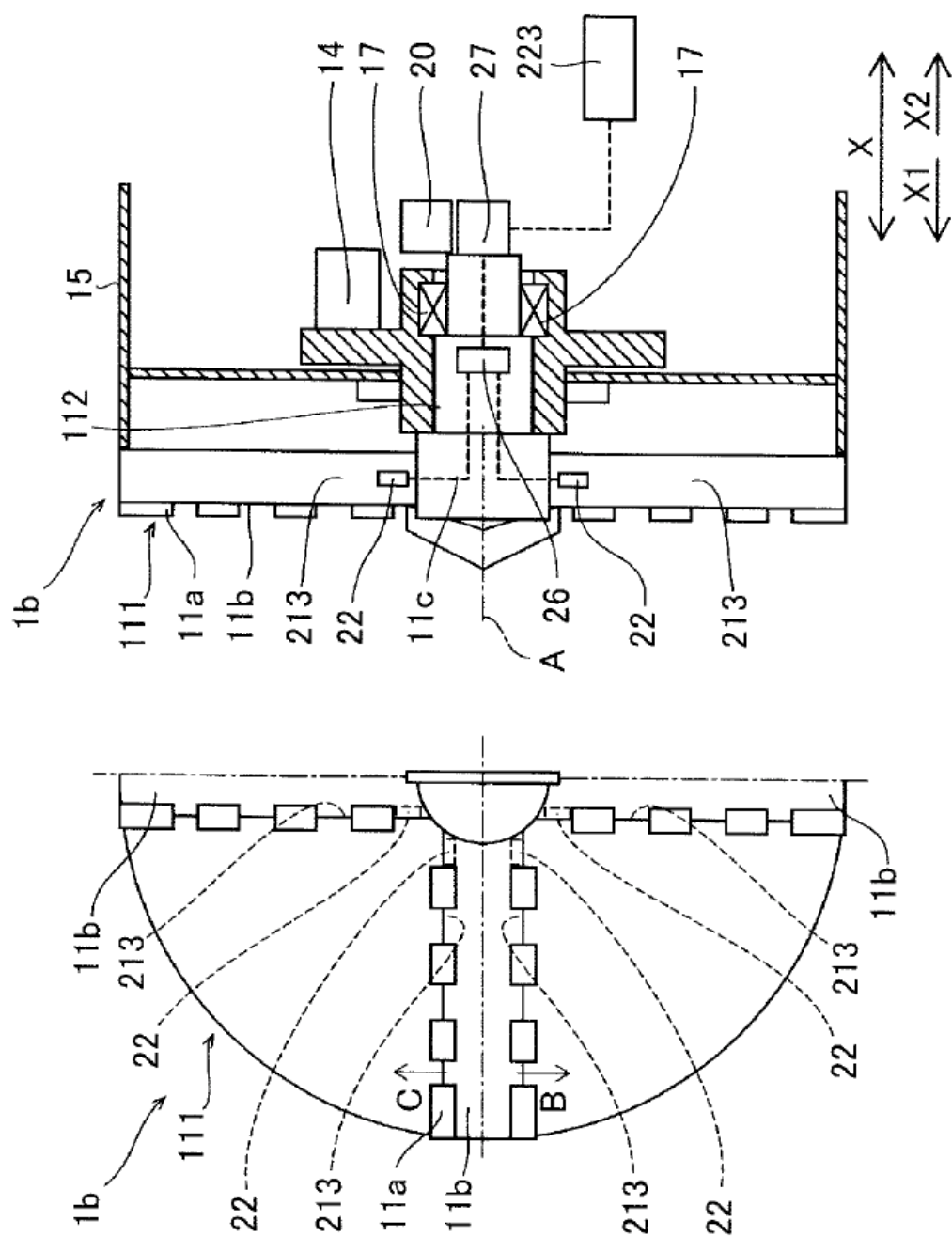


Fig. 14A

Fig. 14B