PROCESS FOR CONTROLLING THERMAL HISTORY OF CZOCHRALSKI-GROWN SILICON

ABSTRACT OF THE DISCLOSURE

A Czochralski method of producing a single crystal silicon ingot having a uniform thermal history from a silicon melt contained in a crucible coaxial with the ingot. In the process the pulling rate of the end-cone of the ingot is maintained at a relatively constant rate which is comparable to the pulling rate for the second half of the main body of the ingot. During the pulling of the end-cone of the crystal at a constant rate, the process may be further refined by, either independently or in combination, increasing the heat supplied to the melt, reducing the crystal rotation rate and/or reducing the crucible rotation rate. The second half of the main body of a single crystal silicon ingot grown in accordance with this process exhibits a relatively uniform axial concentration of flow pattern defects and amount of oxygen precipitated.

Fig.1