

ABSTRACT

A cylinder and a crystal pulling apparatus for pulling a crystal ingot using a Czochralski method are provided. A bottom of the reflector is provided with notches, and the notches are used to provide differentiated flow rates of a protective gas that flows over a liquid surface of a melt in a reference radial direction, based on varying angular orientations of the reflector about a longitudinal axis of the reflector.

(Figure 3)