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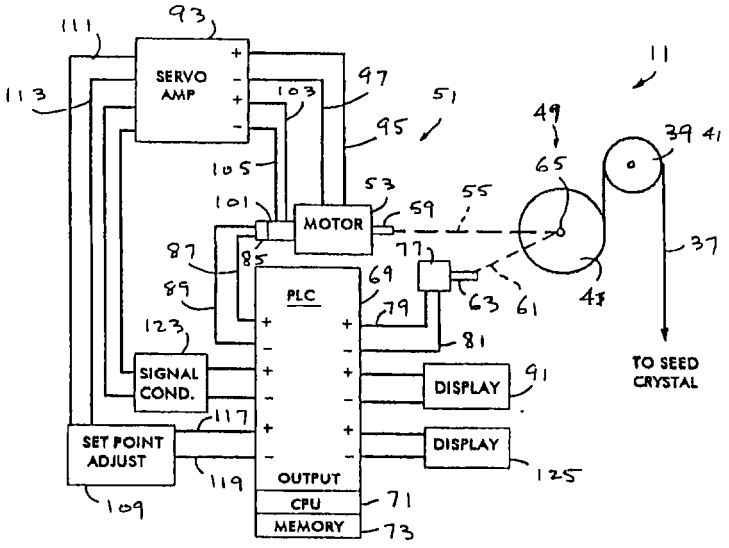
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(54) Title: METHOD AND APPARATUS FOR CONTROLLING DIAMETER OF A SILICON CRYSTAL IN A GROWTH PROCESS



(57) Abstract

A method and apparatus for controlling the diameter of a monocrystalline ingot as it is being pulled from a melt by changing the temperature of the melt. The ingot is pulled from the melt at a target rate that substantially follows a predetermined velocity profile. A temperature model represents variations in the melt temperature in response to variations in power supplied to a heater for heating the melt. In generating a temperature set point representing a target melt temperature, an error between a target diameter and a measured diameter of the ingot is determined and proportional–integral–derivative (PID) control is performed on the error signal. The PID control generates the temperature set point as a function of the error signal. In turn, the temperature model determines a power set point for the power supplied to the heater as a function of the temperature set point generated by the PID control and the power supplied to the heater is adjusted according to the power set point.

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