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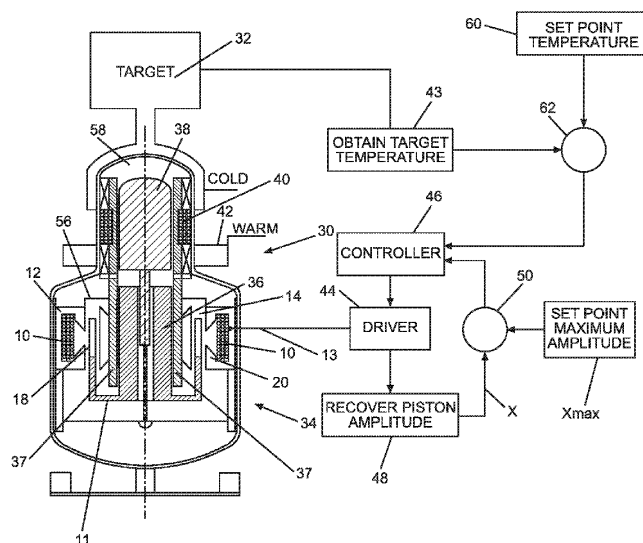
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(54) Title: METHOD FOR AND CONTROL SYSTEM WITH PISTON AMPLITUDE RECOVERY FOR FREE-PISTON
MACHINES

FIG. 8



(57) Abstract: A method and apparatus for detecting the displacement amplitude of an armature of a linear motor or alternator that is drivingly coupled to a load or prime mover. The method and apparatus require only three inputs all derived from the input terminals of the linear motor or alternator: (1) the voltage measured across the linear motor terminals; (2) the current consumed by the linear motor; and (3) the phase between the voltage and current. The three inputs are sensed at the terminals of the linear motor or alternator and used to perform mathematical calculations in the microcomputer of a control system or controller. The mathematical calculations are based on equivalent circuits that are modifications of the equivalent circuit for the linear motor or alternator. The detected displacement amplitude can be used by a controller to limit the displacement amplitude of the armature to prevent collisions.

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