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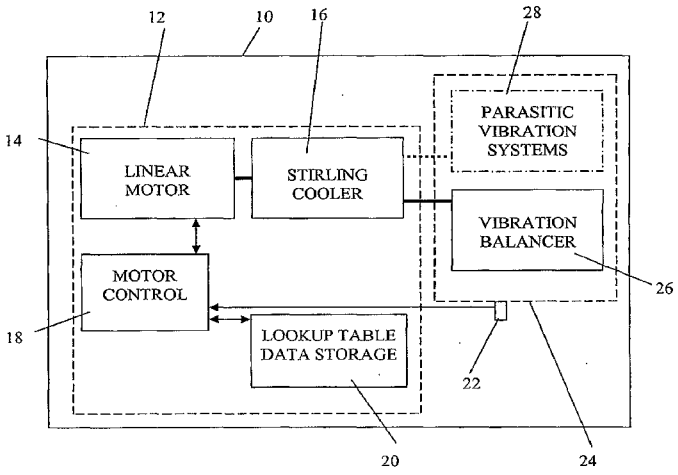
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[Continued on next page]

(54) **Title:** VIBRATION CONTROL OF FREE PISTON MACHINE THROUGH FREQUENCY ADJUSTMENT



(57) **Abstract:** A method and apparatus for minimizing the amplitude of mechanical vibrations of a mechanical apparatus including a linear, freely reciprocating, prime mover coupled to and driving a reciprocating mass of a driven machine in reciprocation at a driving frequency. The coupled prime mover and driven machine have a spring applying a force upon the reciprocating mass to form a resonant main system having a main system resonant frequency of reciprocation. A driving frequency range over which the driven machine operates at an acceptable efficiency of operation is determined and stored. A parameter of the operation of the mechanical apparatus, such as the amplitude of vibrations or an operating temperature, is sensed and the prime mover is driven in response to the sensed parameter at a driving frequency that is offset from the main system resonant frequency of reciprocation, is within the driving frequency range of acceptable efficiency of operation and reduces or minimizes the amplitude of mechanical vibration of the mechanical apparatus under existing operating conditions.

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