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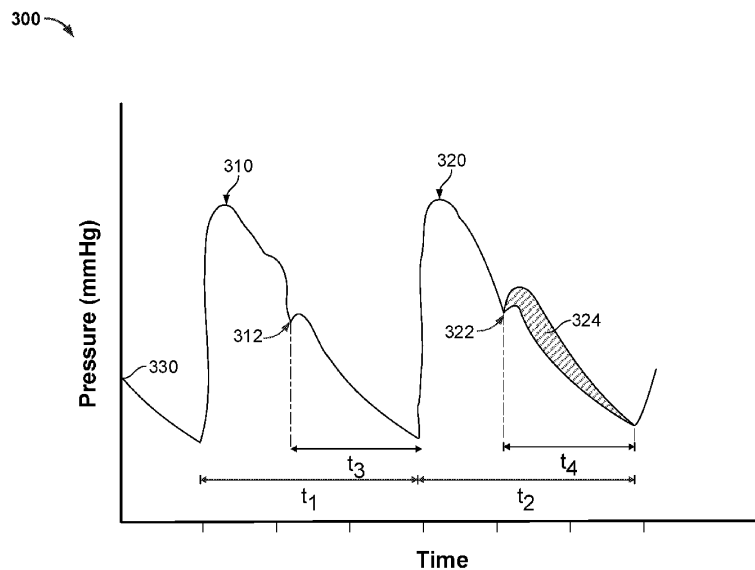


FIG. 3

(57) Abstract: The systems and methods described herein determine metrics of cardiac performance via a mechanical circulatory support device and use the cardiac performance to calibrate, control and deliver mechanical circulatory support for the heart. The systems include a controller configured to operate the device, receive inputs indicative of device operating conditions and hemodynamic parameters, and determine vascular performance, including vascular resistance and compliance, and native cardiac output. The systems and methods operate by using the mechanical circulatory support device (e.g., a heart pump) to introduce controlled perturbations of the vascular system and, in response, determine heart parameters such as stroke volume, vascular resistance and compliance, left ventricular end diastolic pressure, and ultimately determine native cardiac output.

[Continued on next page]

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