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(54) **FLYWHEEL ENERGY STORAGE SYSTEM**

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(57) **ABSTRACT**

A flywheel includes a hub configured to rotate about a longitudinal axis. At least one member having a laminate casing connected to the hub, the laminate casing is formed with an enclosed space for housing at least one mass with a fixed shape. The enclosed space is structured to control radial displacement of the at least one mass. Wherein upon rotation, an operational radial force applies a through thickness laminate radial load to the laminate casing, while simultaneously radially displacing the at least one mass to apply a controllable compressive load on the laminate casing. The applied controllable compressive load increases a predetermined laminate loading capacity by an amount of compressive load counteracting the through thickness laminate radial load, resulting in a corresponding increase in a flywheel angular velocity, that therefore increases an amount of energy stored by the at least one energy storage unit.