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(57) Abstract :
A road vibration energy harvesting apparatus for suspension systems comprises a rack-and-pinion assembly (101), rotary shaft (102), magnetic rotor (103), coil housing (104), spring-mounted piston (105), and a one-way clutch (106). The apparatus captures linear suspension movements, converts them into rotary motion, and generates electrical energy using electromagnetic induction. The generated energy is stored or used for powering onboard electronics via an energy management circuit (107). The invention operates passively and improves vehicular energy efficiency without affecting ride comfort.

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