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*Stirling Engines: Harnessing and Utilizing Heat Energy*

Stirling engines use temperature differentials to convert heat energy into usable mechanical energy. They have many applications, and can be used with nearly any heat source, making them a safe and quiet alternative to other types of engines. The question was: Can Stirling engines be used as practical machines to harness and utilize wasted heat energy? The Hypothesis was: If a gamma type Stirling engine is constructed using relatively available materials, then the Stirling engine will be a practical way to harness and utilize wasted heat energy, because the engine can produce a usable amount of work while using minimal resources. The procedure was accomplished using the engineering design process. Two gamma type Stirling engines were constructed using mainly pop cans, balloons, wire, steel wool, and cardboard. After the first engine was constructed, it was tested on various heat sources, modified, and tested again. The second engine was then built and tested, and specific results such as revolutions per minute and temperature differential were recorded. The second engine's cardboard flywheel was replaced with fan blades to prove its usefulness. The results showed that the greater the engine's temperature differential, the faster the flywheel spun. In conclusion, Stirling engines are practical machines to harness and utilize wasted heat energy, because a usable engine was constructed while using minimal resources, proving the hypothesis correct. The design of the engines could be further modified for efficiency and more tests could be conducted using different and more precise temperature variables.