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Concept Memo
AME40463
1/24/2008

The device is meant to harness and convert solar radiation into more readily usable electrical power. Solar rays will be collected by either a parabolic trough or a parabolic dish and concentrated upon a tube carrying water. With a slow enough flow-rate, by the time the water gets across the dish it will have heated enough to turn into steam. This process will simultaneously have generated pressure. Thus, pressurized steam will be entering the engine.

The steam engine will convert the pressurized steam into mechanical motion when a small amount of steam is allowed into either cylinder. This will force the piston down which will crank an output shaft. Simultaneously, by the time the piston has moved far enough to start venting some pressure out of the exhaust, the alternate piston will have moved far enough to open its valve (restarting the cycle). A generator can be attached to the output shaft to produce the electrical power.

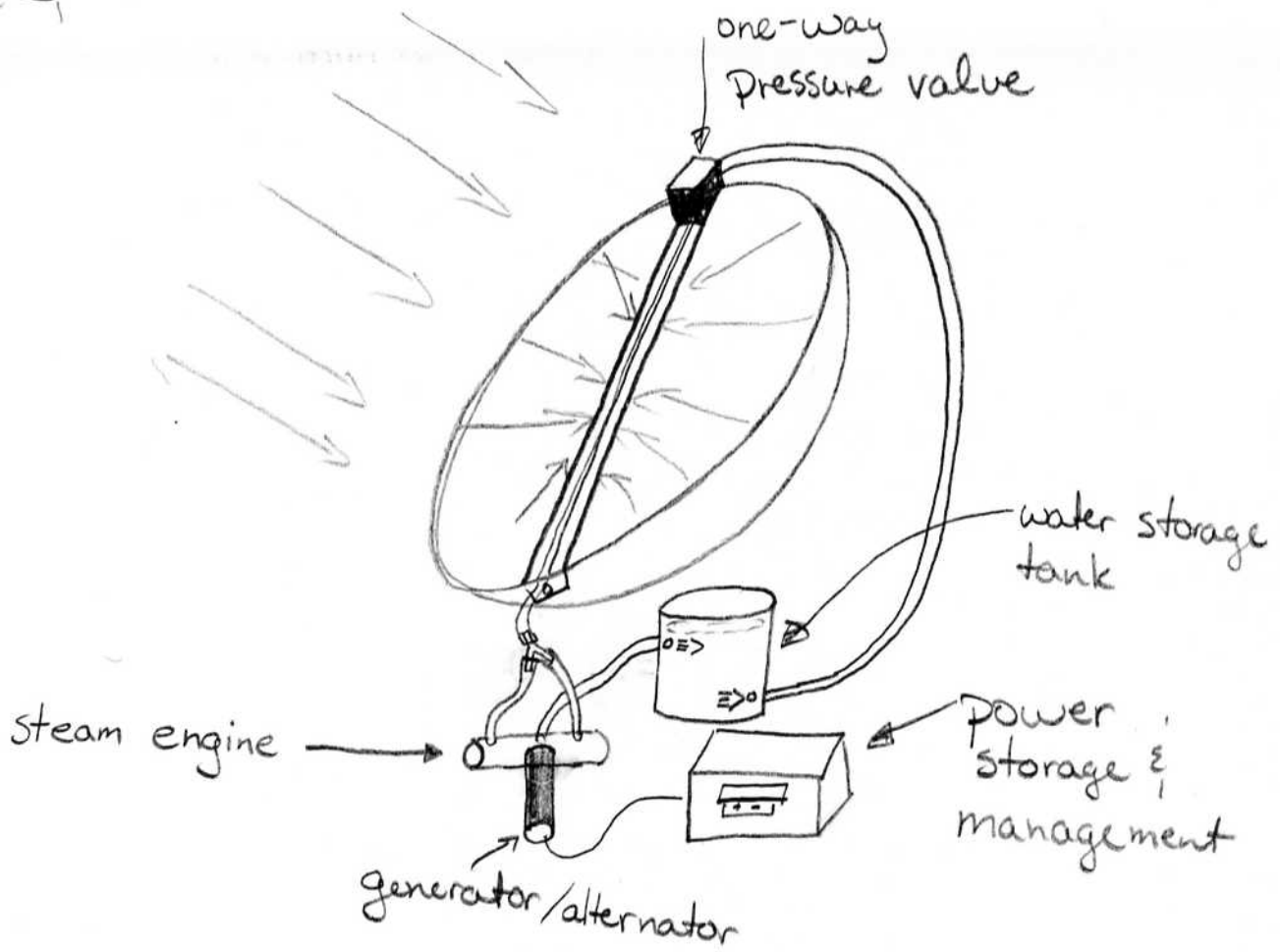
Alternately, to eliminate the shaft, connecting rods and generator, magnets could be inserted into the piston. When this magnetized piston moves through the wire coils encircling the engine, an electrical current will be induced. This could essentially combine the generator with the engine. However, this may result in an excessively heavy piston.

The power storage will be 2 or more 12 V car batteries. These could be connected in parallel, so that the voltage remains at 12 V, but enough energy could be stored to meet the design requirements. The batteries will be housed in a box to shield them from rain. The battery terminals could be connected to external (to the box) terminals protected by a hinged cover.

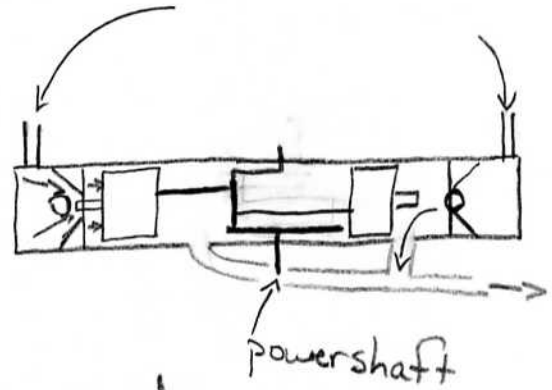
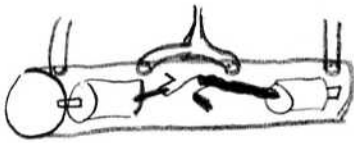
The exhaust from the steam engine will be injected into the water reservoir, effectively helping to heat the water and reduce the amount of sunlight required to create the steam. This tank will have to be positioned above the dish, so that the water can be gravity fed into the dish. Also, this tank will be open to the atmosphere to ensure that no unnecessary pressure is built up (effectively lowering the pressure drop through the engine).

The warmed water from the tank will feed into a valve which will ensure that steam pressure can be built up. The valve must be one direction yet self-opening to ensure that the water is continually fed into the dish for boiling. This requires either analog or digital intelligence. An example of an analog solution is sketched out, but the practicality of this design will have to be tested.

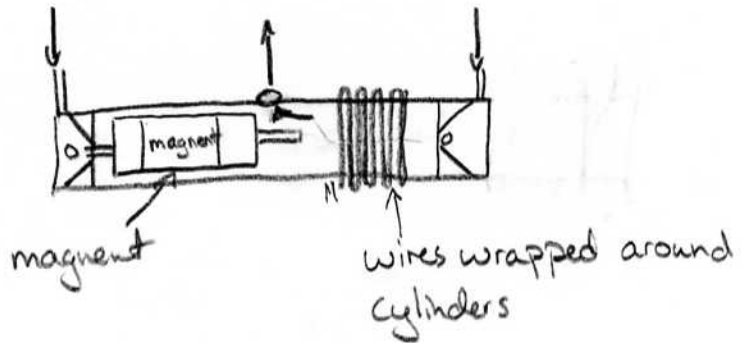
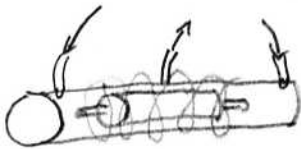
Overall, I believe that this concept has much promise, with the hardest technical challenge being forcing the steam to go the desired direction while allowing the system to be self-feeding.



steam engine

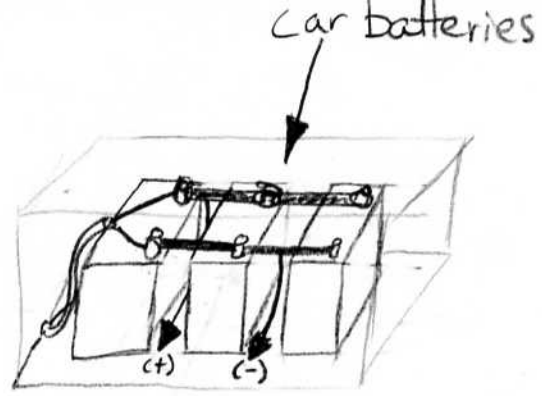
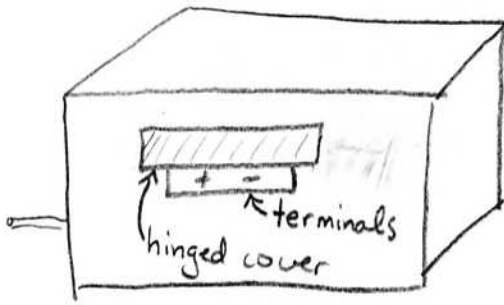


or combined engine-generator

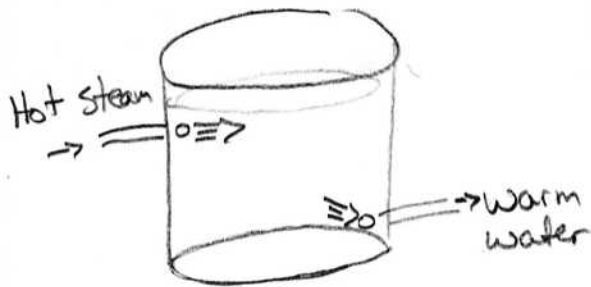


Paul G. Nishi 1/23/08

Power Storage



H₂O



1-way valve

