

A Human Powered Micro-generator for Charging Electronic Devices

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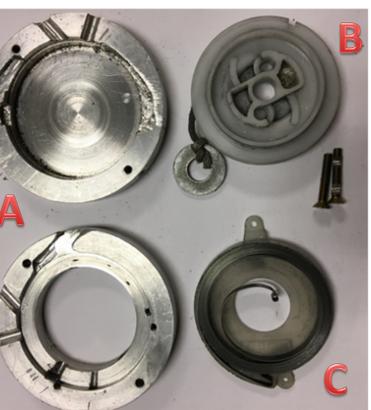
Abstract

A human powered micro generator for charging electronic devices was designed and tested. A preliminary result is presented. The principle for generating electricity is based on Faraday's Law.

Experiment

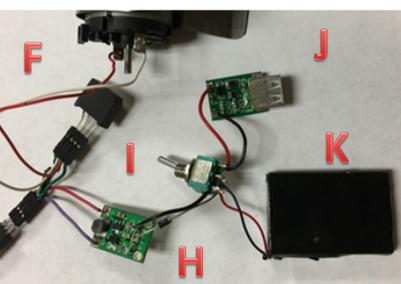
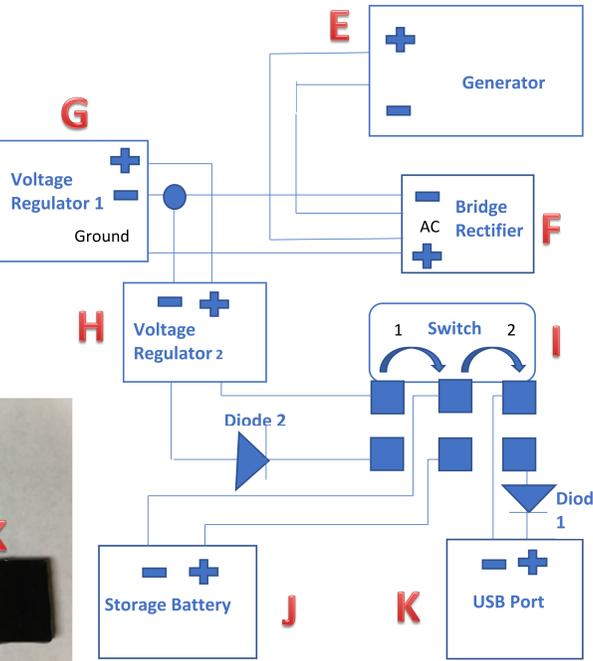
Design & Build

- A- Housing unit
- B- Rotor
- C- Spring
- D- Gear & band
- E- Generator



Circuit Design

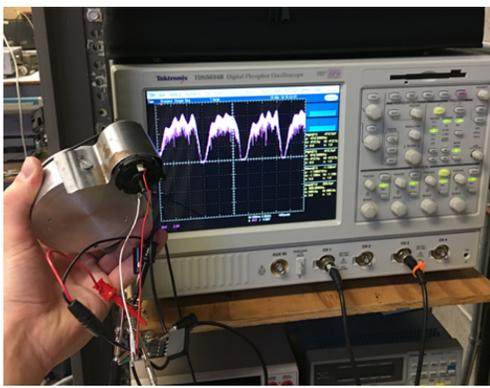
- F-Bridge rectifier
- G/H-Voltage regulator
- I- Switch
- J-Storage battery
- K-USB port



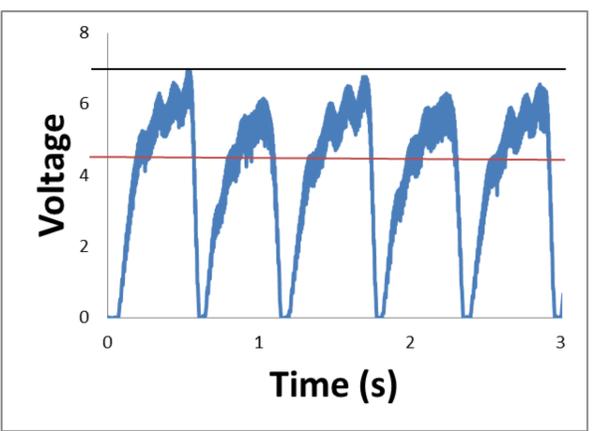
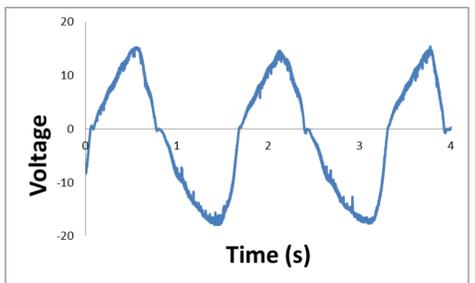
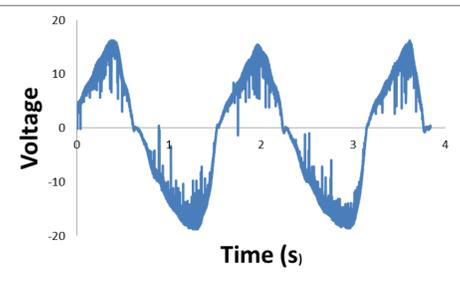
Results & Analysis

Testing

- Generator's raw output, recorded voltage over time
- Measured over 100Ω resistor, recorded voltage over time
- Tested before & after bridge rectifier
- 2 different tests, 13 trials total



Five Data Point Average

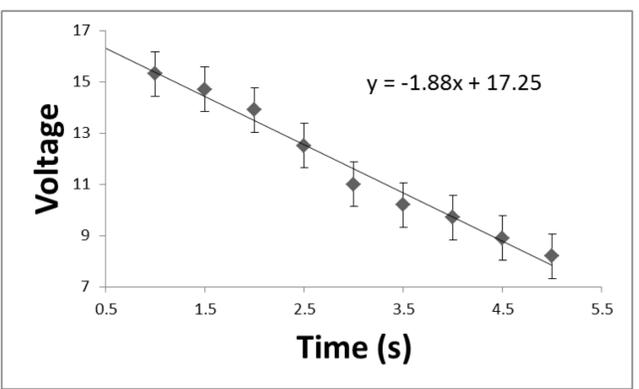


Bridge Rectifier

- Need DC electricity to charge a device
- Doubles efficiency in charging
- Black, peak voltage
- Red, minimum V needed without voltage regulator
- Measured output for 100Ω load

Generators Capabilities

- Peak voltage 15.3V (±1.)
- lowest voltage was 8.1V (±1)
- Line best fit graph is linear
- All times are able to charge the storage battery



Conclusion

Device will provide off grid charging

- Device fits inside a fanny pack with electronic charging
- Storage battery is able to fully charge a phone in 1.5 hours & can charge 2.5 times before a recharge is needed
- Fully recharges storage battery in 16hours (input of 1mA) or one hour of pulling (at 1mA) gives 14 min of charging



Future Work

- Redesign so the outcome can achieve more charging with less pulling time
- Install a generator that supplies a larger current than the original generator
- Use a power bank instead of a storage battery, it will eliminate the need for a switch allowing the device to recharge the power bank and charge electronics simultaneously
- Simplify the circuit, look into using a USB voltage regulator to replace several components

Acknowledgements

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References

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