
An Approach to design a

Frictionless Bicycle Dynamo

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Plan of the Talk...

- Introduction
- Conventional Bicycle Dynamo
- Working of FLBD
- The Complete System
- Advantages & Disadvantages
- Conclusion

Introduction ...

Dynamo:

An Electrical generator which converts mechanical energy into Electrical energy.

As bicycle is a man driven vehicle, the load on the rider should be made as minimal as possible.

In this project, I tried to implement a Bicycle dynamo with no friction between the tires and the dynamo head there by reducing power losses and load on the rider.

Conventional Bicycle Dynamo...

Almost all the conventional dynamo rubs against the side of the tire and powers incandescent lights (both front and rear).

- It slows you down.
- Makes a lot of noise.
- Slips in the wet.
- Wears out the tires.
- They go out as soon as you stop moving.



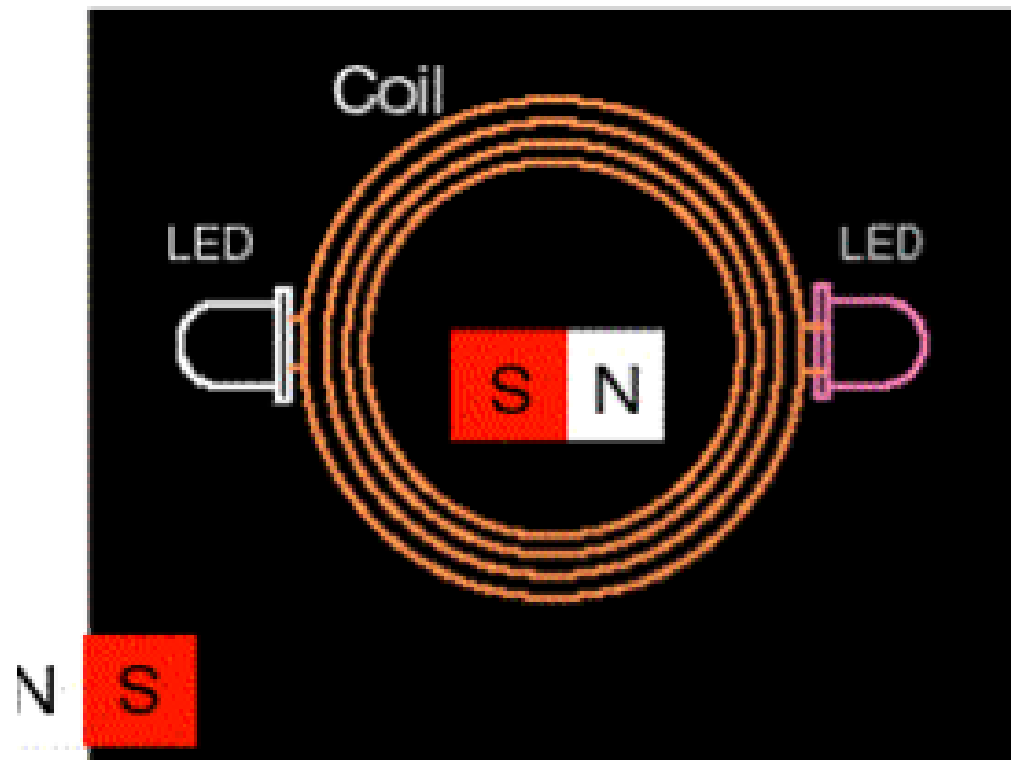
FLBD's Working Principle...

- A small ball magnet is placed in a container, such as a film can, with wire wrapped around it.
- Another magnet, outside the container passes by the film can causing the magnet inside to tumble.
- When the magnet in the container flips, it induces a current in the coil to power the lights.



Working...

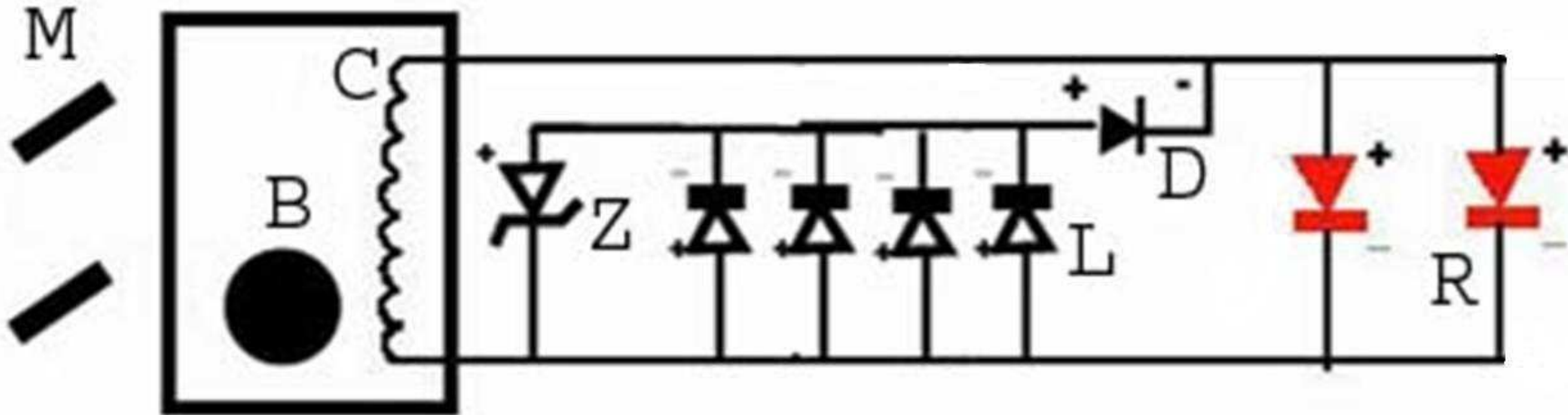
Fig: Showing movement of Ball Magnet with the effect of External Magnet



Components Used...

- A ball magnet.
- 2 bar magnets.
- A 5000 turns coil.
- 4 white front LEDs.
- 2 red back LEDs.
- A 1N4248 diode (protect the white LEDs).
- A 5.1V zener diode.

Schematic Diagram...



The System Overview ...

- The ball magnet is placed inside the coil made.
- It is sealed properly inside a container provided with handle to fit to the bicycle.
- Fix the Bar Magnets on two opposite sides of the wheel's spoke.
- The separation distance between the dynamo and the external magnet should be about 0.5cm.
- For the front Light, High intensity white LED (8000-12000mcd) set is used.
- For Backlight, red LED set is used.

Advantages...

- **High efficiency:** As there is no energy loss due to Heat, Noise due to Friction, the Efficiency is more.
- **Visibility:** Well visible under bright daylight condition.
- **Reliability:** Very reliable and simple design, no maintenance needed.

Advantages...

- This dynamo won't slow cyclist down.
- No friction on any parts of the bicycle.
- No drag can be detected in this device on bicycle.
So, you will not feel any extra weight when you are cycling.

Disadvantages...

- Low power output. So, it can not be used for heavy load like incandescent lamps.
- Possibilities of Magnetic property loss of the external magnet due to external factors like Heat and Mechanical impact.

Conclusion...

- By adopting this design of Dynamo in bicycle, the loss of energy due to friction can be reduced up to zero value.
- Also the noise produced by the dynamo can be reduced.
- Load on the rider can be minimised.

Thank U...