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# SOLAR POWERED MAGNET MOTOR

**Ms S G Shirsikar[1], Ms Prachi G. Shirsikar[2], Ms S P Patil[3]**
sgshirsikar@gmail.com, prachi.shirsikar@gmail.com, kashidshubhangi@gmail.com

**Abstract- It is commonly accepted that the earth's fossil energy resources are limited, and the global oil, gas and coal production will be depleted in time to come, causing prices to escalate. The purpose of this project is to design and develop a switch magnetic field generator/motor. Research was conducted on various designs of existing generator topologies and electromagnetism methods. The final design was selected based on complexity and cost. Throughout the semesters, a demo prototype has been re-designed to evaluate the effectiveness of the system. Using the theory of attraction and repulsion forces between the electromagnets, a rotational force is induced to create a driving motion for the prototype. The magnetic field strength of the electromagnets does not solely depend on the core material itself, but also on the amount of induced current and number of turns of coiled wire around the magnet. At the end of this project, we will evaluate my current prototype and give practical recommendations to improve the design. Harnessing free energy would be a continuous pursuit of the world and by going green in today's context would greatly reduce the stress caused on nature.**

## I. INTRODUCTION

In modern world energy is needed for almost everything. It is almost impossible to imagine life without electric lights, television, cell phones, laptops and desktop computers and more. Energy is consumed by almost every device that makes your life easier and more comfortable. It is also needed by life saving devices, such as heart defibrillators, nebulizers and an uncountable host of other things. Energy is most often used in context of energy recourses, their development, consumption, depletion and conservation. Since economic activities such as manufacturing and transportation can be energy intensive, energy efficiency, energy dependence, energy security and price are key concerns. In short without energy modern life would be impossible. However all of that energy comes at a cost. The environment plays dearly for our energy generation, as do the animals and plants that share this world with us. In addition, energy generation comes at a financial cost to us constantly mounting electric bills are another hallmark of the modern age.

## II. CONVENTIONAL ENERGY SOURCES

Every electric device needs an electrical supply as an input. But in this project, without any electrical input, gets output as mechanical energy.

As the conventional energy sources are depleting day by day and unreliability of non-conventional energy sources (wind, tidal, sun, etc), there is need of creating reliable and free energy source.

## III. DESIGN OF SOLAR POWERED MAGNET MOTOR

It consists of two coils wound with copper windings connected across each other through reed switch. Reed switch is an electromagnetic switch which is normally closed and when it comes under influence of magnetic field it gets open. Across each coil free-wheeling diodes are connected. Ring shaped toroid permanent magnets are kept above two coils with center support and free to rotate above coils.

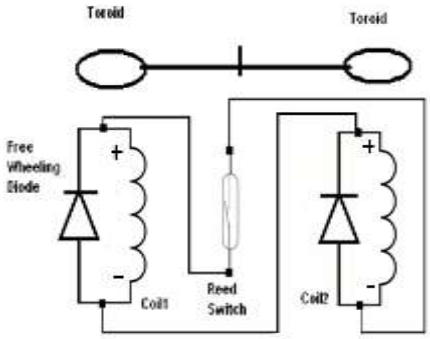


**Fig1: Schematic of the of solar powered magnet motor**

## IV. WORKING PRINCIPLE

Solar Powered Magnet Motor works on two basic principles:

1. Faradays Law of Electromagnetic Induction
   Whenever the number lines of force linking with coil changes, an E.M.F. is induced in it.
2. Lenz's Law
   The direction of E.M.F. induced such that the current produced by it opposes the changes in flux linkages.

When toroid magnet is kept above the winding, flux will pass through the coils but no emf is induced because there is no rate of change of flux cut. Hence to induce emf, initial twist is to be given to toroid magnet .Thus emf is induced in two coils.

If we keep turns of two coils same, emf induced in both coils will be same and as they are connected across each other no current will flow through the circuit.

Hence to make current flow, we should keep certain voltage difference between two coils. This is done by design principle of transformer. If we take same gauge, same material wire, voltage peer turn remains same. Hence if difference in turns is kept by certain ratio say 1.1, we get voltage difference with certain approximations. Because of this spikes of different heights are obtained across two coils.

Voltage Spikes Generated in the two coils

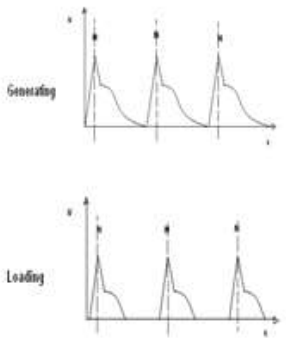

**Fig2: Voltage spikes generated in two coils.**

## V. NEED OF REED SWITCH

The basic reed switch consists of two identical flattened ferromagnetic reeds, sealed in a dry inert-gas atmosphere within a glass capsule, thereby protecting the contact from contamination. The reeds are sealed in the capsule in cantilever form so that their free ends overlap and are separated by a small air gap. A Reed Switch is a small electromechanical device having two ferromagnetic reeds that are hermetically sealed in a glass envelope. They range in length from 2.0 inches long to as small as 0.025 inches long.

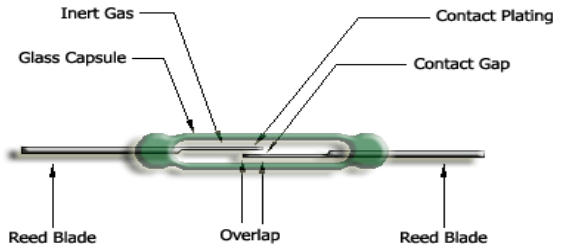


**Fig3: Reed Switch**

As it is normally closed switch, when it comes under influence of magnetic field it gets open. Initially it is kept away from influence of magnetic field, thus it acts as closed switch. Therefore when emf is induced in two coils, current get circulated through the coils because of closed path. This current flows through the coil in such a way that it produces N pole below toroid magnet. Hence the repulsive force is generated between N pole generated by coil and n pole of toroid.

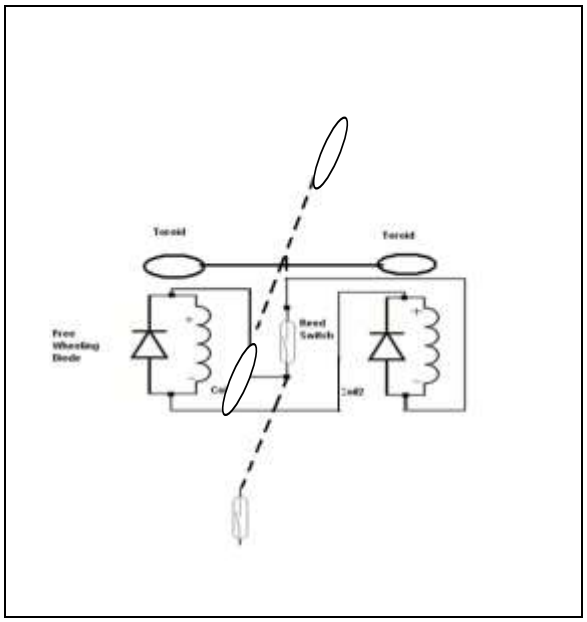


**Fig4: Motion of the Toroid Magnet.**

Now, when toroid is approximately rotated by 90˚, it will not get attracted by other coil to keep rotation continuous because same pole is generated by another coil also. Hence to keep rotation continuously there should be attraction force to be produced by other coil.

This function is done by reed switch. It happens because of toroid magnet comes under the reed switch and due to influence of magnetic field, reed switch kept opened, hence connection between two coils get open. Induced emf in coil now get discharged through freewheeling diodes in opposite direction hence opposite poles are generated by coils i.e s pole due to which toroid magnet is get attracted by other coil in same direction, because of interaction of system.

When again toroid magnet comes above coil, sufficient repulsive force should be generated to repel toroid magnet in same direction as rotation.

Value of required repulsion force is calculated from mmf,

$$mmf = N*I$$

Turns of coil are already decided while keeping voltage difference and current is calculated from spikes generated across coil and resister measured from guage of wire and no. of turns hence required mmf to push toroid magnet can be calculated.

If it is not enough to push magnet we must have to increase guage of coil. Thus with certain approximately required magneto-motive force should have to produced.

How to stop?

First bring the reed switch in influence of magnetic field by touching it to the cu coil. Now reed switch will get open and emf will discharge through LED's. But due to inertia toroid is still rotating which produce emf in coil but no current will flow because of open circuit of reed switch as well as LED's and rotations will slowly get diminished.

## VI. CONCLUSION

Permanent magnet motors and generators offer several advantages like decreased installation space for higher power and unnecessary gearboxes. These advantages apply for several fields and are intensively used in the machine tool, compressor, and energy generating industry. Designing and producing these high speed permanent magnet motors and generators is an exciting task, where the usage of most modern computational methods for the development process is as important as a wide range of experience and expertise to extend actual operation limitations in a safe way. Not only is the knowledge of high speed permanent magnet motors necessary but also a deep inside in inverter technology, partial discharge phenomenon and so called stray or additional loss.

## VII. FUTURE SCOPE

Renewable energy source is the need of the time. Due to scarcity of the energy, in future, this project will find huge demand in generation as well as in industries.

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