CHAPTER 1

INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

Every electrical system needs power for its working. Power is rated as per the amount of energy required to accomplish the work. Higher power consumption by an industry leads to huge bills along with penalties too. According to the law of energy 'Energy can neither be created nor be destroyed.'

Nikola Tesla once said that, all people should have energy sources for free. There is electricity everywhere present in limitless quantities and can drive the world's equipment without the need for gas, coal or oil. Free energy means zero cost energy. Mechanical energy which drives windmill, or Solar energy in solar cell which is converts into DC current other energies obtained are from wind power, water power & telluric power. Free energy generation is a process to generate these types of energy.

Free energy suppression is the notion that corporate energy interests intentionally suppress technologies that may provide energy at very low cost. Free Energy generally means a method of drawing power without fuel to be burnt from the local environment.

Some of the methods which can be used as the free energy devices are as follows:

- Battery-Charging Pulsed Systems
- Moving Pulsed Systems
- Energy-Tapping Pulsed Systems
- Aerial Systems and Electrostatic Generators
- Motionless Pulsed Systems
- Fuel-less Motors
- Magnet Power
- Passive Systems
- Gravity-Powered Systems.

1.2 ENERGY OUR LIVES

In the modern world, energy is needed for almost everything. It's almost impossible to imagine life without electric lights, without televisions, cell phones, laptop 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 lifesaving devices, such as heart defibrillators, nebulizers and an uncountable host of other things.

Energy is most often used in the context of energy resources, 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 pays 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 you - constantly mounting electric bills are another hallmark of the "modern age."

1.3 OBJECTIVE

- The main objective of system is the utilization of gravity using the flywheel.
- The primary step for this is to increase ratio of input speed to output speed.
- The secondary step is to use the energy generated by the alternator to the load bank
- Obtaining the maximum output and calculating the maximum efficiency of the working model.

1.4 PRINCIPLE

The aim of this project is to recover energy of flywheel by using principle of energy recovery system from flywheel and produce enough energy to run the project set up and also some additional energy to run external power supply.

The true scientific method is to improvement scientific theory by observed fact and new discoveries, but the true scientific method is not being followed at the present time.

1.5 FREE ENERGY

Energy becomes free only after some point since we do not have to pay charges for electric power generated through these non-conventional methods for generating electric power. There is no such thing as Free Energy. Any electric power from Solar cells, Wind, Tidal, Geothermal, Hydro-electric is only free, after we starting up these methods for generating electric power by providing some capital cost

1.6 DESCRIPTION

1.6.1 FIELD OF PROJECT: The present in project refers to a self-contained system of energy regeneration, which in addition has several advantages set out below.

1.6.2 BACKGROUND OF THE PROJECT: It has been known for many years, how to construct machines which can generate electric current. These are known by the generic name of "electric power generators", consisting of rotating machine that transforms mechanical power into electrical power as a result of alternative action between a magnetic field and a moving conduct

However, the various types of generator which make up the current state of the art, require the help of a motor, which transforms mechanical power into electrical energy, and that motor requires an independent power source which must be supplied continuously.

Thus, a system capable of generating its own power supply as well as providing an extra power supply for other purposes, is not known in the current state of the art.

1.6.3 SUMMARY OF THE PROJECT: The applicant for the present project has designed an self-contained energy regeneration system, capable of producing its own operating energy in addition to generating a surplus which can be used in electrical networks using voltage converters required for any electrical installation, whether in homes, offices, warehouses etc.., with it is possible to reach places where it is difficult to install the power grid, allowing its use as an alternative source of energy other than solar or wind power. Other applications would be in the automotive field, as a power source for motorcycles, cars, etc. by connecting the system to the propelling motor, and thus achieving the necessary motion of the vehicle.

CHAPTER 2

LITERATURE SURVEY

CHAPTER 2

LITERATURE SURVEY

2.1 HISTORY

This chapter is concerned about literature review on the related work. First we had searched for the topic on internet .Then we collected the information from the research papers. After getting more knowledge about it decided to work on it using the same idea but in our own way.

2.2 PREVIOUS WORK

1. India considers its own free energy program a matter of national pride, and is very much willing to risk antagonizing Petrodollar countries with its support on Reactionless AC Synchronous Generator (RLG) invented by its own **Paramahamsa Tewari**, an electrical engineer and former Executive Director of Nuclear Power Corporation of India. Years ago, Tewari has also proven the theories inside Bruce de Palma's homopolar engine which first exposed this writer to the world of free energy technologies
2. Two Cairns inventors unveiled a world first commercial machine which can power a house from a permanent, clean, green and virtually free energy source. The machine, developed by Brinsmead mechanical engineer **John Christie** and Edge Hil electrician **Lou Brits**, has an international patent pending and is expected to go on the market for $4000-$5000. Relying on the attraction and repulsion of internal magnets, the Lutec 1000 operates continually on a pulse-like current 24 hours a day - producing 24 kilowatts of power - once it is kick-started from a battery source. The device is more than 500 per cent efficient, compared to a car which is less than 40 per cent efficient and loses power through heat and friction.
3. Inventor **James M. Robitaille** and the Fix the World Council have released an energy generator, inspired by Tesla's 1894 "Electric Generator" (Patent No. 511,916). Modified and modernized, the plans for this Quantum Electric Generator (QEG) have been released to the public and made open source. The machine is strong enough to power a household and is the size of a modern gas generator. According to the council, the machine is "scaled

to produce electrical power in the range of 10-15 kW (kilowatts) continuously, and can be set up to provide either 120 Volt or 230-240 Volt single phase output."

4. **Nikola Tesla** was a multi-disciplinary genius. His discovery of the rotating magnetic field in 1882 led to a series of US Patents in 1888, which gave us the AC electric power system still in use today. This one achievement earned him the honour of being called "The Man Who Invented the 20th Century". But Nikola Tesla's most famous attempt to provide everyone in the world with free energy was his World Power System, a method of broadcasting electrical energy without wires, through the ground. His Wardenclyffe Tower, was never finished, but his dream of providing energy to all points on the globe is still alive today.

2.3 PRESENT WORK

Free energy generation has come up with various free energy devices. At present the researchers are working on AC power generation which is much more expensive. The researchers have come up with a block diagram and also the flowchart. Circuit components used in the project are still being researched.

Electrical power system consists of three principal components:

1. Power station
2. Transmission lines
3. Distribution system

The transmission lines are the connecting links between the power station & distribution systems. A distribution system connects all the individual loads in a given locality to the transmission lines. Which increase the capital cost and also the running cost. Various free energy generation projects are working in progress such as bicycle generator, hybrid vehicles etc.

2.4 PROJECT STATEMENT

In industrial field, efforts should be made to achieve overall economy so that per unit cost of production is as low as possible. The problem of determining the cost of production of electrical energy is highly complex. Nowadays there is an equipment that can solve this problem at small scale which is a free energy generation projects. This project specifically is not the free energy generation but deals with efficient energy generation using flywheel. Flywheel is the plays the leading role which stores the energy in the form of kinetic energy.

Normally in automotive, the battery provides the starting initial supply to appliances connected in vehicle. As the engines runs using fuel which drives the car alternator, the car alternator generates its own energy and charge the battery which is connected to load such as lamps, AC, horns etc. Same concept is being applied in this project. But the initial start is by using DC motor replacing the engine.

CHAPTER 3

COMPONENT SPECIFICATION

CHAPTER 3

COMPONENT SPECIFICATION

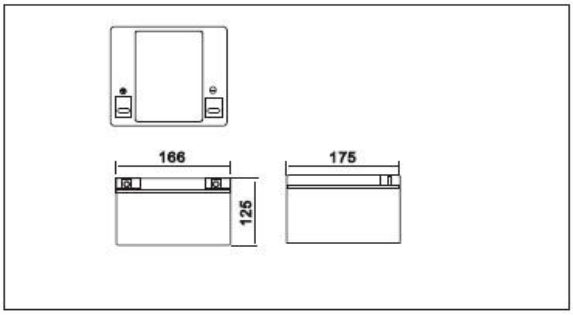
3.1 BATTERY

Battery used in this project is of 12v 60amp-hour. Most of the batteries fails to supply the rated rating in winter. Therefore it is essential to use high rated batteries then the requirement. As two batteries are being used, the PMDC motor consumes 12v 20.8amp. Therefore the initial start to run the motor need 12v 26amp-hour battery.

Specifications

Nominal Voltage		12V
Rated capacity (20 hour rate)		26 Ah
Dimensions	Total Height	125 mm (4.92 inches)
	Height	125 mm (4.92 inches)
	Length	175 mm (6.89 inches)
	Width	166 mm (6.54 inches)
Weight Approx		8.0 Kg (17.6 lbs)

Outer dimensions (mm)



Characteristics

Capacity 25℃(77℉)	20 hour rate(1.30 A)	26.0 AH
	10 hour rate(2.39 A)	23.9AH
	5 hour rate(4.42A)	22.1AH
	1 hour rate(15.60A)	15.6AH
	1.5 hour discharge to 10.5V	10.4 A
Internal Resistance	Full charged Battery at 25℃(77℉)	8 mΩ
Capacity affected by Temperature (20hour rate)	40℃(104℉)	102%
	25℃(77℉)	100%
	0℃(32℉)	85%
	-15℃(5℉)	65%
Self-Discharge at 25℃(77℉)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	82%
	Capacity after 12 month storage	64%
Terminal	T4、T13	
Charge (constant Voltage) Cycle	Initial Charging Currentless than 10.4 A Voltage 14.10-14.40V	
Charge (constant Voltage) Float	Voltage 13.50-13.80V	

Terminal Type (mm)

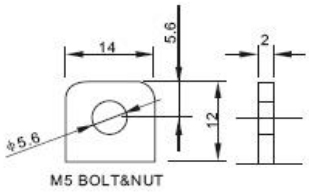


Table no 3.1 Specification, Characteristics and Dimension of Battery

3.2 FLYWHEEL

Material	Strength	Comments
Ceramics	200-2000 (compression only)	Brittle and weak in tension, therefore eliminate
Cast Iron	**8-10**	**Very low**
Lead alloys	3	Very low
High strength steel	100-200	Cheaper than Mg and Ti alloys

Table 3.2 Flywheel strength depending upon material

DIMENSION:

Mass: 35 Kg

Radius: 15 Cm

Inner Diameter (Shaft): 1.75 Cm

3.3 CAR ALTERNATOR

Output vs Temperature:

Operating temperature also affects output - higher temperatures resulting in lower outputs. Heat reduces output, and shortens alternator life.

"Cold" Amps rating is for an ambient air temperature of 77 degrees Fahrenheit (25 C), such as when an engine is first started, and will often be 10 - 25% higher than the hot rating.

"Hot" Amps rating is for an ambient air temperature of 200 deg. Fahrenheit (93 C), such as when an engine has been operating for some time.

Alternator RPM	**Alt. "Amp" Cold/Hot**
2000	51/41
2500	78/63
3000	92/76
3500	102/85
4000	108/92
4500	114/96
5000	118/99
5500	121/102
6000	123/104
6500	124/106

Table 3.3 Alternator RPM vs Alt current

Alternator specification:

Bosch 0 123 510 063

Voltage rating- 14 volts

Current rating- 120 amp

Features: • High specific power and efficiency

• Small dimensions

• Low weight

• Low noise level

• Higher protection against accidental contact

• Long life operation

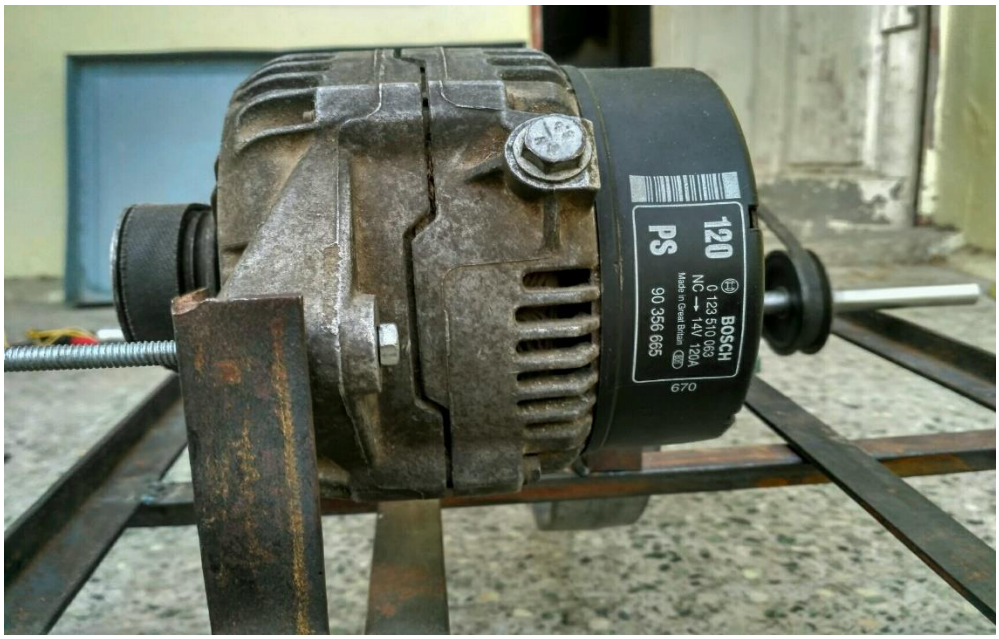


Fig 3.3 Car Alternator

3.4 GENERAL CONSIDERATION

In this System Design We Mainly Concentrate on the Following Parameters the system consists of design of various parts like Pulley, Flywheel, Belt drive, Shaft, Bearings etc.

Fig 3.4 General Consideration

3.4.1 DESIGN OF SHAFT AND BEARINGS:

There is one shaft in the Layout of the system. Thus Design of Shaft is to be calculated in order to find the proper Shaft diameter which would withstand the load easily and to ensure the maximum energy is transfer with minimum loss. Bearing selection is also some important criteria in order to ensure smooth and long lasting functioning of the system.

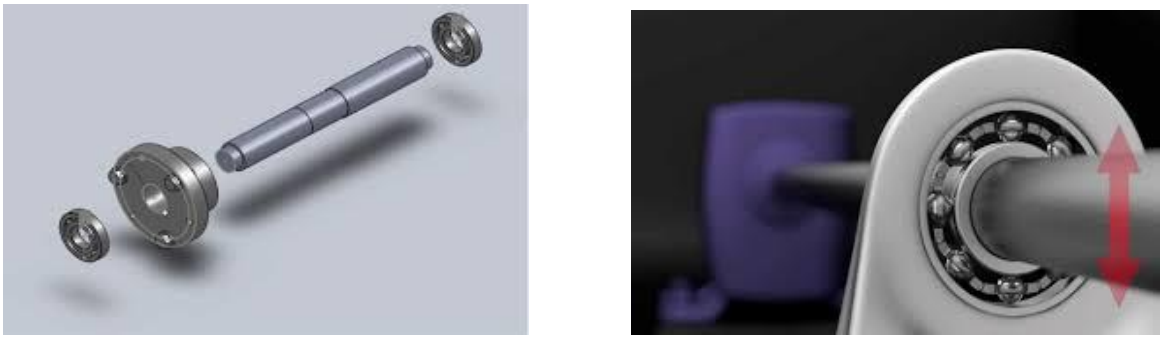


Fig 3.4.1 Design of shaft and Bearing

3.4.2 DESIGN OF BELT DRIVE:

At the first stage we selected pulley as per standard specification. We know that a belt drive is useful for the power transmission using pulley. Each pulley has different diameters and speed. The belt, wire (rope) drives are used for the power transmission. In the project, we are going to use total four pulleys, so we need two different belt drives.

Pulley ratio: - Motor : Flywheel :: 3:1

Flywheel : Alternator :: 5:1

Fig 3.4.2 Design of belt drive

3.4.3 DESIGN OF FLYWHEEL:

This Project is all about generation of free energy with using the gravitational energy. Thus we are using flywheel of mass 20(10kg+ 5kg each adjustable plate) that can utilize the gravitational energy and give us more output.

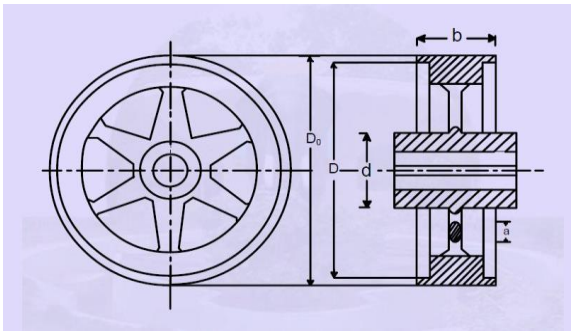


Fig 3.4.3 Design of Flywheel

CHAPTER 4

CONSTRUCTION AND WORKING

CHAPTER 4

CONSTRUCTION AND WORKING

The basic model of Efficient Energy Generation consist of following components:

1. Battery-2 nos.
2. PMDC motor
3. Flywheel
4. Car alternator

4.1 PMDC Motor

In a **PMDC motor**, permanent magnets (located in stator) provide magnetic field, instead of stator winding. The stator is usually made from steel in cylindrical form. Permanent magnets are usually made from rare earth materials or neodymium.

A simple dc motor consists of a rotor & a stator. The stator of the machine does not move & normally is the outer frame of the machine; the rotor is free to move & normally is the inner part of the machine. Both of them are usually made up of ferromagnetic materials. Slots are cut on the inner periphery of the stator & the outer periphery of the rotor. Conductors are placed in these slots of the stator or rotor. These are interconnected to form round windings. The winding in which voltage is induced is called armature windings & which current is passed field winding. Permanent magnets are used in some machines to provide the main flux of the machine.

The rotor is slotted armature which carries armature winding. Rotor is made from layers of laminated silicon steel to reduce eddy current losses. Ends of armature winding are connected to commutator segments on which the brushes rest. Commutator is made from copper and brushes are usually made from carbon or graphite. DC supply is applied across these brushes. The commutator is in segmented form to achieve unidirectional torque. The reversal of direction can be easily achieved by reversing polarity of the applied voltage.

The image below shows the **construction of Permanent Magnet DC Motor.**

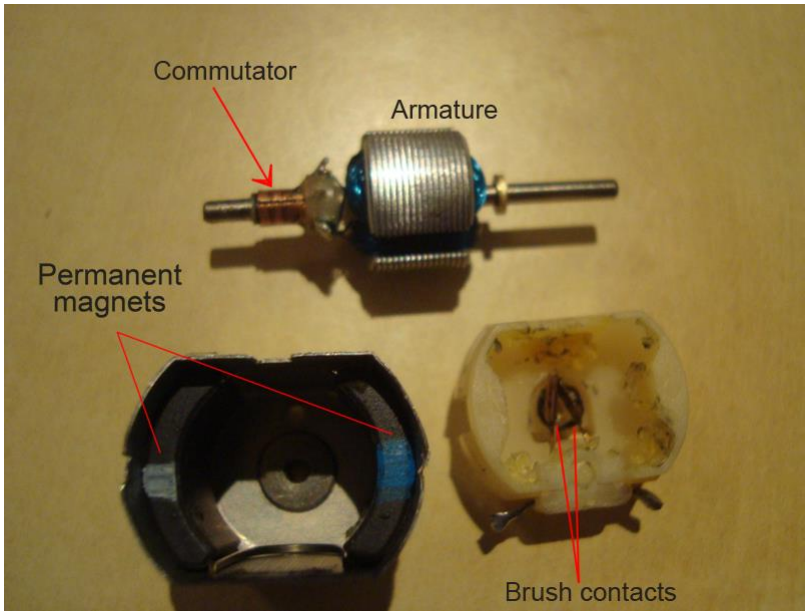
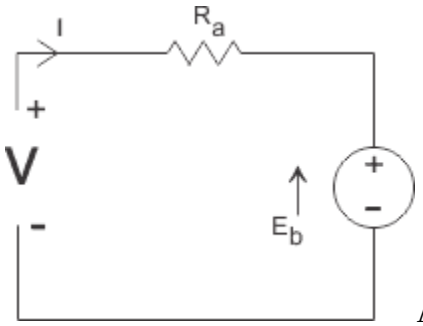


Fig 4.1. Permanent Magnet DC motor (disassembled)

Fig 4.7 (b) PMDC Motor

4.1.1 EQUIVALENT CIRCUIT OF PERMANENT MAGNET DC MOTOR OR PMDC MOTOR



As in PMDC motor the field is produced by permanent magnet, there is no need of drawing field coils in the equivalent circuit of permanent magnet DC motor.

The supply voltage to the armature will have armature resistance drop and rest of the supply voltage is countered by back elf of the motor. Hence voltage equation of the motor is given by, $V = IR + E_b$ Where, I is armature current and R is armature resistance of the motor. E_b is the back emf and V is the supply voltage.

4.1.2 ADVANTAGES OF PERMANENT MAGNET DC MOTOR OR PMDC MOTOR

PMDC motor have some advantages over other types of DC motors. They are:

1. No need of field excitation arrangement.
2. No input power in consumed for excitation which improve efficiency of DC motor.
3. No field coil hence space for field coil is saved which reduces the overall size of the motor.
4. Cheaper and economical for fractional kW rated applications.

4.2 FLYWHEEL

Flywheels are typically made of steel and rotate on conventional bearings; these are generally limited to a revolution rate of a few thousand RPM. Some modern flywheels are made of carbon fibre materials and employ magnetic bearings, enabling them to revolve at speeds up to 60,000 RPM (1 kHz).

Carbon-composite flywheel batteries have recently been manufactured and are proving to be viable in real-world tests on mainstream cars. Additionally, their disposal is more eco-friendly.

Flywheel is constructed considering following parameter:

1. Load 2. Speed (RPM) 3. Torque

From which the diameter, width, mass, size is being calculated and manufactured accordingly.

In this project the flywheel used is of cast iron and two plates are used for increasing weight of flywheel as per requirement. Flywheel has a support by a shaft of 17mm diameter and the shaft is inserted in bearing for smooth operation.

Weight: 10-35 kg (10kg flywheel + 25 kg each adjustable/removable plate)

Diameter: 30 Cm

Width: 5 Cm

Fig 4.2 Flywheel with removable plate

4.3 CAR ALTERNATOR

4.3.1 DESIGN:

The alternator is a three-phase, 12-pole synchronous self-excited generator with two internal fans and built-in regulator and rectifier. The compact construction and carefully selected materials assure improved technical characteristics and long life, service free, operation even under the harshest conditions of high and low temperatures, salt spray, humidity, water, dust, vibrations, and aggressive liquids.

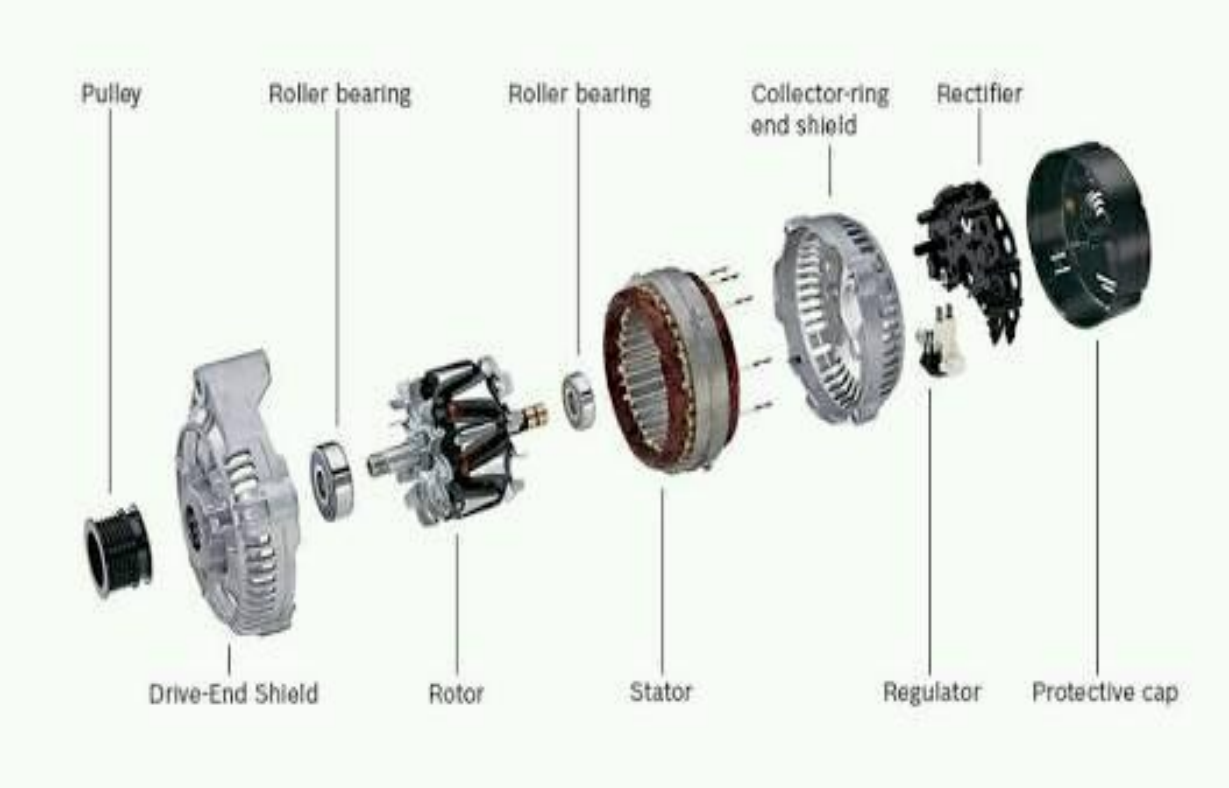


Fig 4.3 interior of automotive alternator

4.3.1(A) STATOR:

The stator has a three-phase winding on a laminated pack. The selected design and high filling factor of the stator slots provides improved cooling, low noise and high output characteristics.

4.3.1(B) COOLING:

Two internal fans positioned on the claw poles provide more effective cooling with lower noise and higher protection against accidental contact as well as higher output.

4.3.1(C) ROTOR:

Smaller slip rings provide higher brush durability, even at high speeds. Encapsulated slip rings offer increased durability of the alternator.

4.3.1(D) RECTIFIER:

Sandwich construction of the rectifier with press fit Zener diodes provides the low temperatures of the rectifier diodes, high resistance to vibrations and protection of loads on the vehicle against alternator overvoltages. The installation of the rectifier on the outer side of the rear end bracket ensures flexible arrangement of all types of terminals.

4.3.1(E) REGULATOR:

The regulator together with the brush holder is assembled on the rear end bracket. Regulators use microelectronic technology and are mono or multifunction. The highest quality of brushes ensure long life of the alternator.

4.3.1(F) BRACKETS - BEARINGS – PULLEYS:

Brackets, bearings and pulleys are made according to the customers' requirements. A range of special sealed bearings makes it possible to design alternators for specific installations, operating in the harshest conditions whilst achieving long, maintenance free life.

4.3.1(G) ELECTRICAL TERMINALS:

Electrical terminals are according to the requirements.

4.3.2 WORKING OF AUTOMOTIVE ALTERNATOR:

An alternator differs from a dc motor in that it contains no permanent magnets. Instead, there are two concentric wound coils of wire within the alternator: a stator coil (the outside coil which does not rotate) and a rotor coil (the inside coil, attached to the alternator's pulley, which does rotate). The rotor is also referred to as the alternator's "field."

An electromagnet is created when current flows through the field coil. The strength of the magnet is directly proportional to the amount of current flowing through the field. As the rotor moves clockwise, the resultant magnetic field sweeps clockwise through the outer coil of wire, and electricity is generated in the stator coil. Since the magnetic field sweeps back and forth through the stator coil, an alternating current is produced. The alternating current has a frequency equal to the frequency with which the alternator's pulley is rotating.

For this process to begin, the alternator's field must start with some kind of current. Rotating the rotor coil itself does absolutely nothing, unless there is current flowing through the coil, producing a magnetic field. Thus, it is necessary to have the alternator hooked up to a battery to supply this initial current.

Since the purpose of the alternator is specifically to charge batteries, the alternating current it produces is rectified through a diode bridge. The resulting current is direct current, which can be used to charge an attached battery. This dc current can also be used to supply the field coil with current during operation. As a result, the field coil draws current from the battery only until the alternator is capable of producing its own electricity. Once the alternator is producing electricity, it is self-sustaining.

The voltage coming out of the alternator depends on two variables: the amount of current flowing through the field coil (i.e. the strength of the magnetic field) and the speed at which the alternator's field is rotating. The alternator has a regulator that tries to keep the voltage across the battery at a steady 14.4V (the optimal voltage to recharge 12V car batteries). It does this by regulating the amount of current flowing to the field coil. Once the alternator is self-sustaining, the only current flowing to the field originates from the alternator itself. If the output voltage is too high, the

regulator lowers the current flowing to the field coil. If the output voltage is too low, the regulator increases the current flowing to the field coil. Simply put, as long as the alternator can maintain at least 14.4V across the battery, making the pulley spin faster or slower will have absolutely no effect on the power output. Power output in such a case will depend only on the load attached to the alternator.

It is important to take note that before the alternator is self-sustaining, the current flowing to the field is unregulated. The initial current depends only on the resistance of the coil, the resistance of anything placed in series with the coil, and the state of charge of the battery connected to the field coil. This is critical to understand if the alternator will be run at speeds lower than intended (below 2100 rpm).

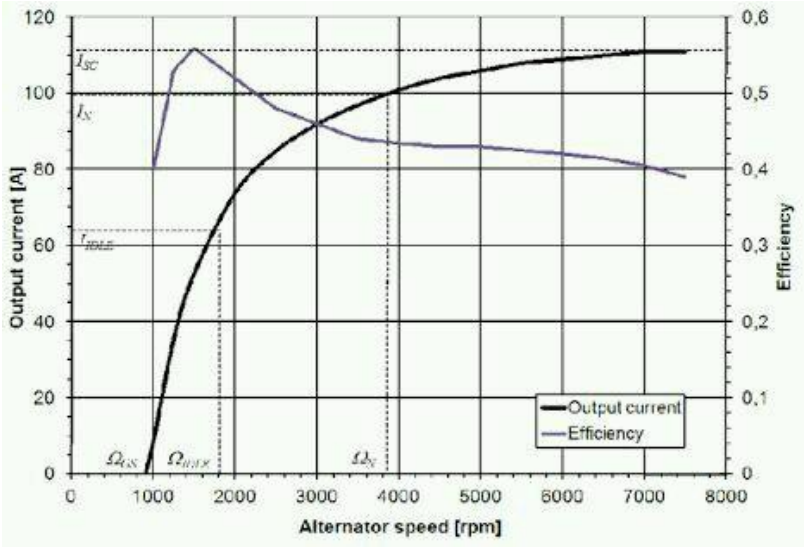


Fig 4.3.2 characteristics of car alternator

4.3.3 HOW TO CONNECT AN ALTERNATOR TO THE BATTERY

There are four connections that must be made to properly hook up an alternator. The alternator's metal case serves as ground, and must be connected to the battery's negative terminal. There is a post at the top of the alternator; this is the positive post, through which current to the battery will flow when the alternator is operating. It must be connected to the battery's positive terminal. Two

additional wires are also connected to the top of the alternator. These connect the regulator and the field coil to the battery.

It is important to determine which wire connects to the regulator and which goes directly to the field. This can be easily determined using a multimeter. Check the resistance between each of the wires and the case (ground). The connection between ground and the regulator will have a very high (near infinite) resistance across it. The connection between ground and the field will have a low (less than 100 Ohm) resistance.

The regulator connection acts as a kind of internal voltmeter for the alternator. With this wire, the alternator checks the voltage across the battery and uses feedback to the field coil to keep it at a constant 14.4V. An extra connection from the alternator to the battery is necessary to allow other voltage drawing devices (such as diodes, etc.) to be connected in series with the battery. If the alternator only regulated voltage across its own output, the voltage would have to be split across all components attached to it, and the battery might not receive the ideal 14.4V. Thus, it is important that the regulator wire be attached directly to the battery's positive terminal, and not anywhere else.

It is equally important – perhaps even more so, actually – that the field coil wire not be attached directly to the battery's positive terminal. In a car, the field coil is connected to a switch, a small warning light, and then the battery's positive terminal. The switch isolates the battery from the field coil when not in use. This is important, as otherwise the battery will run itself down powering the field coil when the alternator is not operating. Some kind of switch should always be wired up in between the field connection and the battery. A simple push button (default off) switch can be very effective; to start the alternator, the switch is held down until the alternator becomes self-sustaining. At that point, the switch can be released, since current to the field is internally supplied through the regulator.

The light wired in between the field coil and battery is also very important. For one, it can be an important diagnostic tool, warning the operator that current is flowing from the battery to the alternator (i.e. the switch is closed, but the alternator has not yet become self-sustaining). Much

more importantly, however, the light provides an additional resistance in series with the field coil. Current to the field coil is unregulated until the alternator becomes self-sustaining.

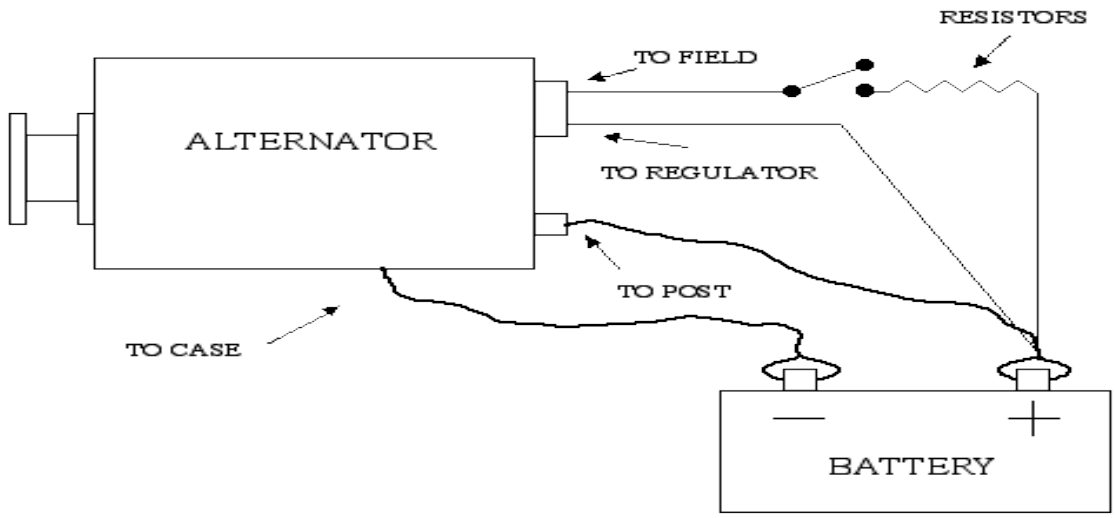


Fig 4.3.3(a) Alternator connection with external regulator wire

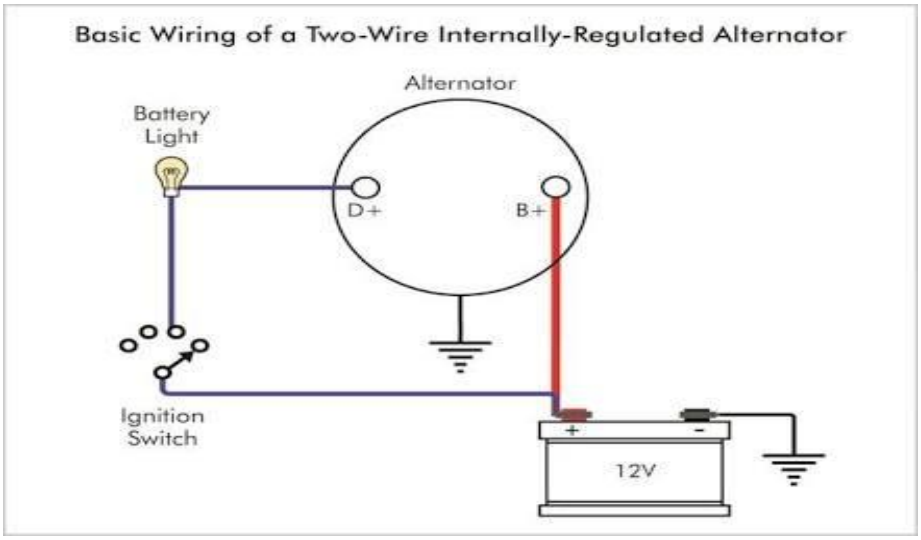


Fig 4.3.3(b) Alternator connection with internal regulator

4.3.4 CIRCUIT DIAGRAM OF ALTERNATOR

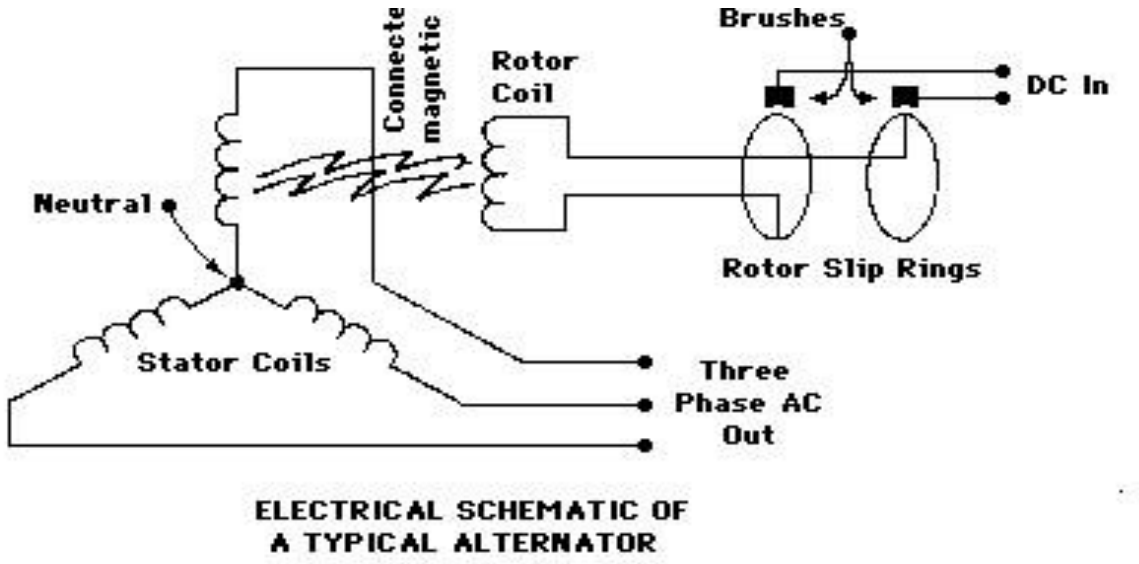


Fig 4.3.4(a) Schematic of typical alternator

4.3.5 NOTE:

- The alternator turns clockwise.
- The battery's negative terminal must be connected to the alternator's case.
- The field coil should not be connected to the battery when the alternator is not in operation. Use a switch to isolate the coil from the battery when not operating the alternator.
- The field coil must have some kind of resistor connected between it and the battery. Shorting the coil directly to the battery will draw too much current and can destroy the alternator
- If the alternator is not generating electricity at system speeds, try using a slightly smaller resistor in series with the field to provide more initial current to the field.
- The alternator regulates the output current to put 14.4V across the battery. If the alternator is producing 14.4V, running the alternator faster will not increase the power output of alternator.

4.4 CONSTRUCTION OF MODEL:

The project model is supported on the metallic bar frame of 0.75m in length, 0.45m breadth, and 0.2m of height. The PMDC motor of 12v 20 amp is fixed at the corner such that the shaft is facing towards out. The motor is fixed at the height of 0.15m from supportive frame. The shaft of motor is of 1 cm diameter. The pulley of motor is of 11cm diameter. The flywheel used in project is of 35kg in which two removable plates are used of 5kg each of 0.27m diameter. The circumference of flywheel is 0.95m. The shaft of 1.7cm is permanently fixed with flywheel. The flywheel is fixed at the at the centre of frame with support of bearing which is fixed 5cm away from flywheel at both side for smooth operation. The shaft of flywheel consist of pulley at both the end. The motor centre shaft and flywheel centre shaft is at 0.27m distance from each other. The motor drives the flywheel through v-belt. The pulley on the shaft of flywheel at motor side is of 8cm and the pulley fixed at the other end to alternator side is of 14cm. The alternator centre shaft and flywheel centre shaft is at 0.27m from each other. The pulley attached to the alternator shaft is of 5.5cm and mechanical handle as external as required. The alternator is fixed at the height of 0.18m from metallic frame. The battery used can be placed on the frame remaining corner.

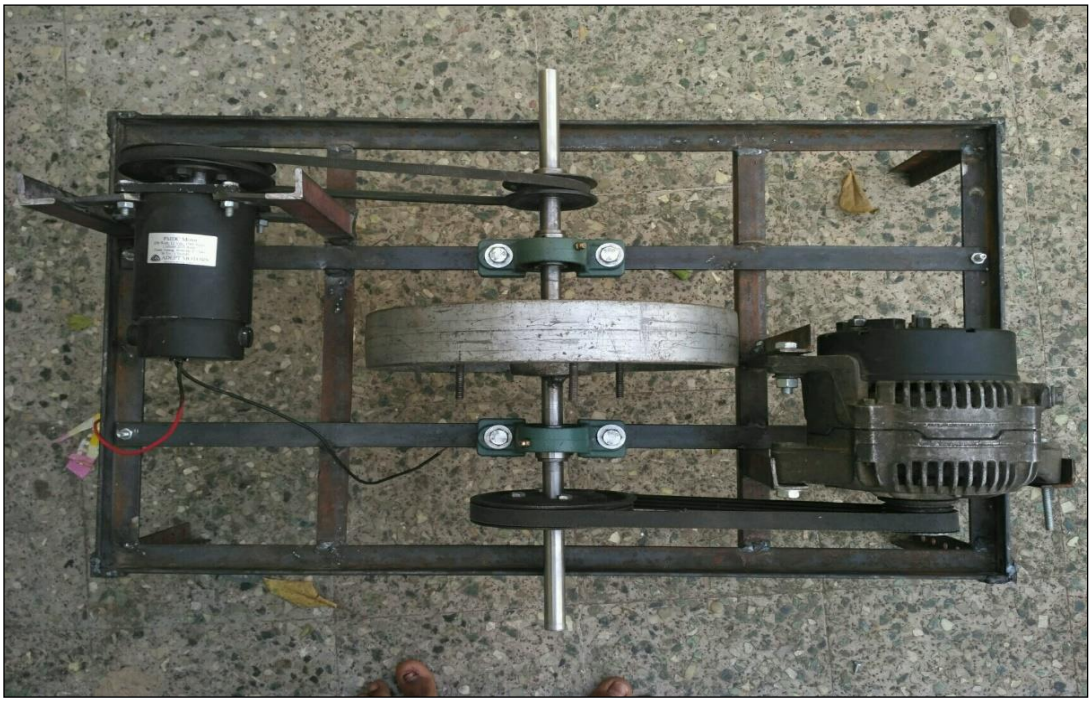


Fig 4.4(a) construction of model

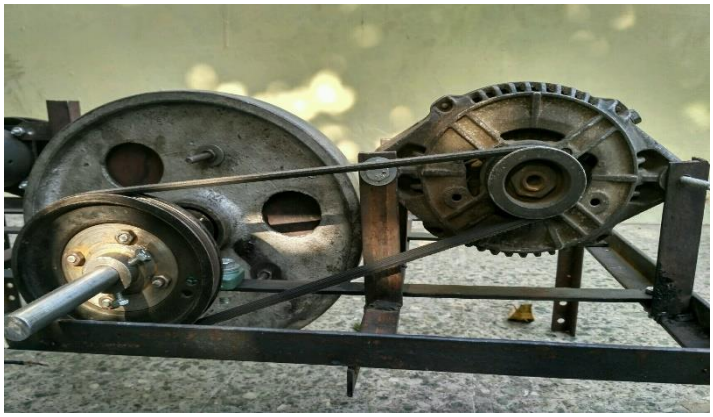


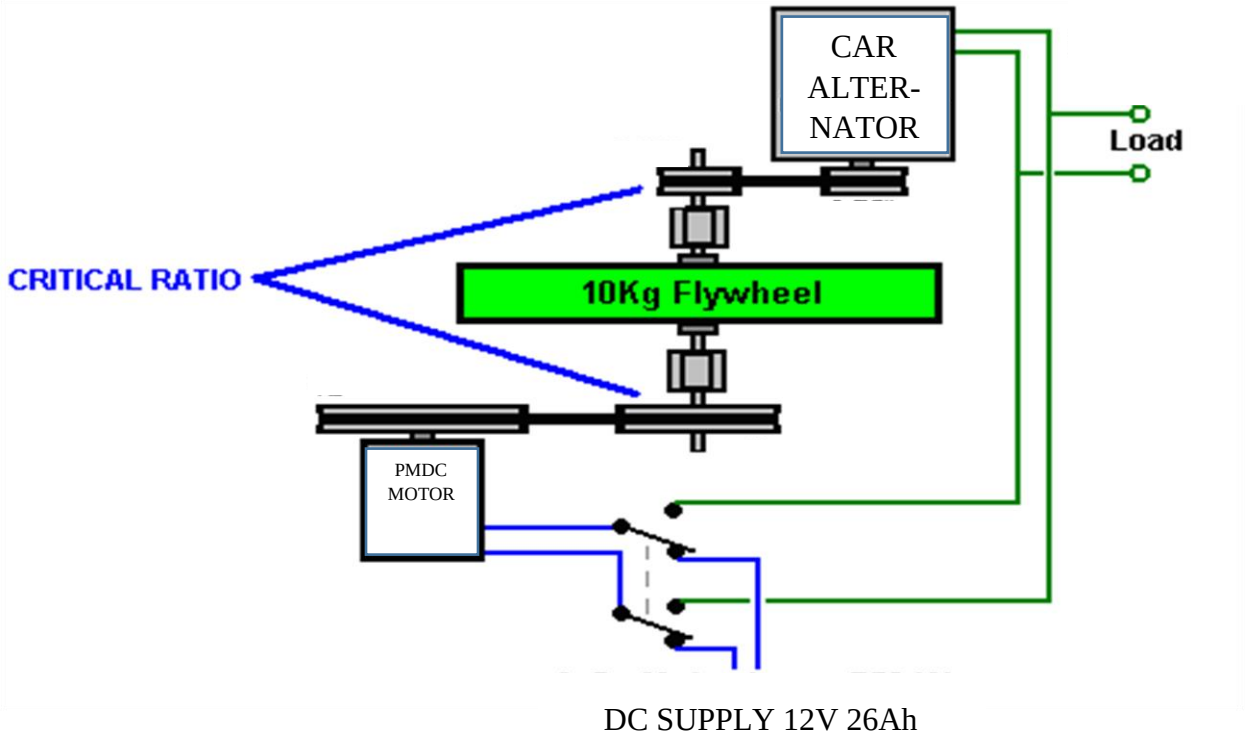
Fig 4.4(b) Belt drive (pulley 5:1 Ratio)

Fig 4.4(c) belt drive (pulley 3:1)

4.5 CONNECTIONS:

- Battery (1) terminal should be connected through switch to motor terminals as input.
- Case is ground; connect the case to the battery's negative terminal.
- The metal post on top of the alternator that is B+ terminal should be connected to battery positive terminal which flows current to the battery.
- The regulator connection (high resistance to case) connects directly to the battery's positive terminal.
- The field connection (low resistance to case) connects to a switch, then to resistors, then to the battery's positive terminal.
- The output terminal of alternator is connected to battery (2) and motor terminal (through switch).

4.6 SCHEMATIC DIAGRAM OF THE PROJECT MODEL



DC SUPPLY 12V 26Ah

4.7 BLOCK DIAGRAM

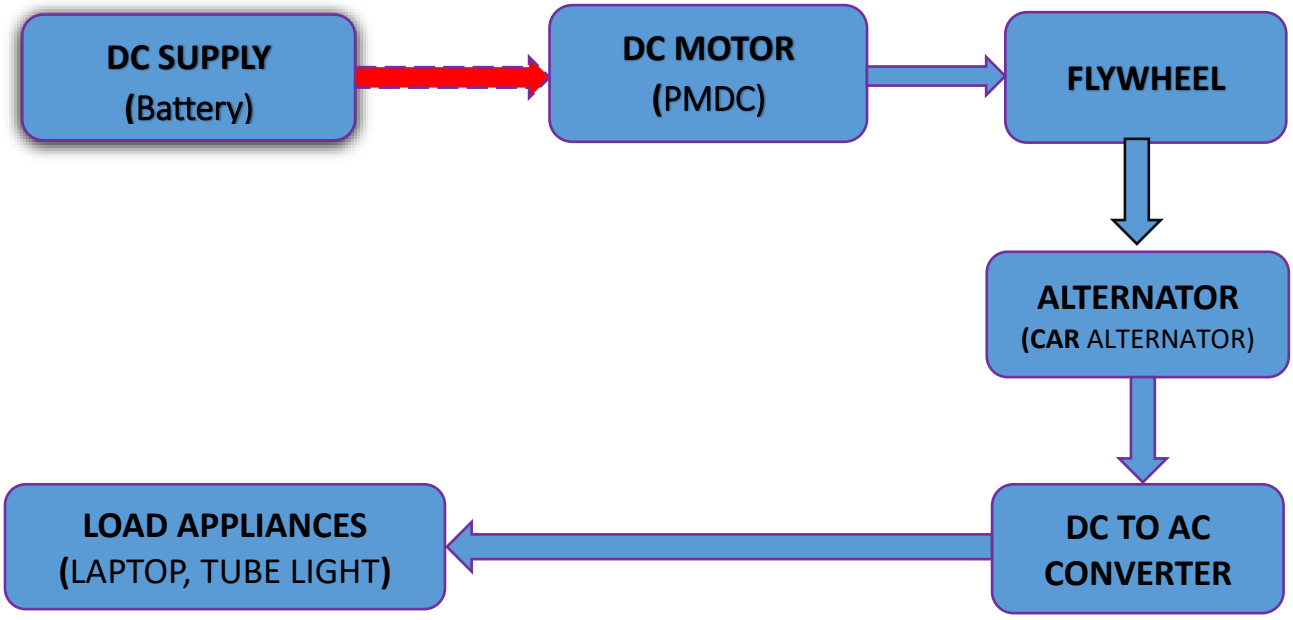


Fig4.5 (a): System before disconnecting the battery from DC Motor

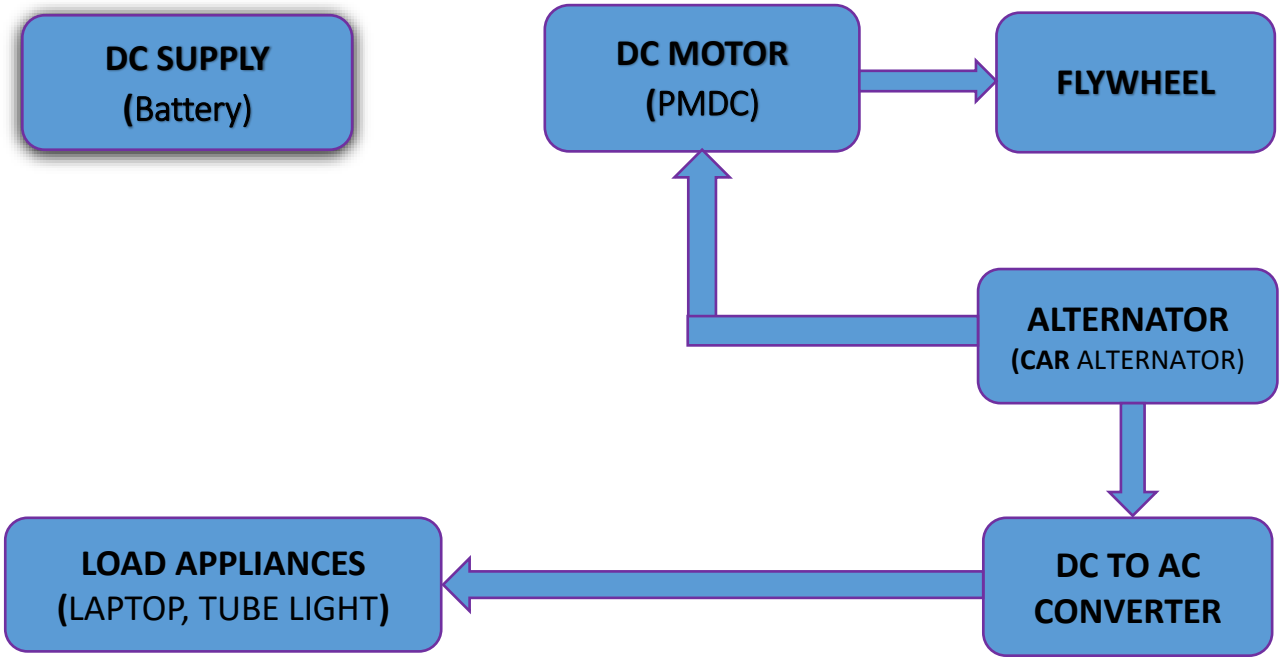


fig4.5 (b): System after disconnecting the battery from DC Motor

4.7.1 BLOCK DIAGRAM DESCRIPTION

4.7.1(a) DC SUPPLY

Battery of 12v 80 Amp-hr is used as primary source to the DC motor. This Battery is isolated from DC motor terminal when the alternator starts to generate energy.

4.7.1(b) DC MOTOR

Permanent Magnet direct current (PMDC) motor of voltage: 12v, current rating: 20.8 amp, no load speed: 1500 RPM, power: 250 watt is used and runs on battery. This motor drives the further the flywheel.

4.7.1(c) FLYWHEEL:

A flywheel is a simple form of mechanical energy storing device. Energy is stored by rotating disc to spin about its axis. Flywheel used is of weight: 20 kg, diameter: 30 cm, width: 5 cm

4.7.1(d) CAR ALTERNATOR

The alternator used in the project is Car alternator of rating voltage: 12v, Current: 120amp idle speed 3000 RPM. Alternator consists of Voltage regulator, diodes, rectifier etc. Alternator finally generates DC current at 14.4v.

4.7.1(e) CONVERTER

As alternator generates DC current, DC appliances can directly run through charged battery. But for the AC appliances there is a need of DC to AC converter.

4.7.1(f) LOAD APPLIANCES

Load used can be dc load such as dc bulb, dc fans etc. or through converter ac loads such as fan, tube light etc.

4.8 WORKING OF MODEL

The rechargeable battery of 12v 26amp-hr fully charged is connected through switch to the PMDC motor terminal which runs on 750 rpm due to the mechanical load connected to it. The battery is as such connected that it should be disconnected whenever not in use. (Switch will be provided)

The motor drives the flywheel using the pulley-belt. The pulley ratio used is 3:1. As motor idle speed is around 750RPM the flywheel will run at 3 times more than motor that is at the speed around 2250RPM. This flywheel stores the kinetic energy in it.

Both the ends of flywheel are attached with the pulley at end of shaft. The pulley ratio of flywheel to alternator pulley is 5:1. As the flywheel at this stage runs at 2250 RPM the alternator run 5 times

more than flywheel that around 11250RPM. Now the alternator is running around 11250 RPM. The B+ terminal of alternator is connected to another battery of 12v 80Amp-hr which charge the battery when alternator start to generate electricity and the D+ terminal is connected to the resistor (such as light lamp of some resistance limiting the field current up to 0.2 amp). The stator field of alternator is charged by battery to produce electromagnetic field. As the field is produce the alternator starts generating electricity in DC current form. Due to electromagnetic field in air gap between stator and rotor of alternator, the back emf is generated which cause cogging that is the magnetic locking. This reduces the actual speed of the overall system. The actual speed at some extent can be overcome by mechanical pedal. The motor then reduce to 300RPM, flywheel to 900 RPM and alternator to 4500RPM. (At extreme case motor reduces to 200RPM, flywheel to 600RPM, and alternator at 3000RPM which is sufficient from generation).The generated energy is of 14.4v 120amp that 1728 (at peak) is distributed between Motor and Load connected (dc load). Motor needs 250 watt and the remaining is shared to load. At the same time the battery connected to motor is disconnected and the motor is connected to alternator output terminal(Switch between battery(1) and motor is OFF and at the same time switch between battery(2) and motor is switched ON). This is how the closed loop is form. It will be continuous running system till the closed loop path is not isolated. And then can be called as “FREE ENERGY GENERATION”.

Drives:

- **PMDC motor**:

  Voltage rating: 12V

  Current rating: 20.8 amp

  Speed (in rpm): 1500 rpm (rated), 750 rpm (load as system), 300RPM (electrically loaded)

  Watt: 250watt

- **Car Alternator:**

  Voltage rating: 14Volt

  Current rating: 120 amp

Speed (in rpm): 11250RPM-4500RPM-3000RPM respectively.

Output (max) : 1728 watt

Wheel:

- **Flywheel:**

Mass: 35 Kg :(10 kg+ (7.5kg*2) + (5kg*2) kg adjustable plate)

Speed (in rpm): 2250RPM-900RPM-600RPM respectively.

Block diagram shown describes the overall working and is explained above:

4.9 CALCULATION

1. MOTOR

At NO LOAD: TORQUE=HP*5252/RPM

=0.33*5252/1500

=1.15544 lb-ft. ~ **1.5665 N-m**

At Mechanical load: TORQUE=0.33*5252/750

=2.31 lb-ft. ~ **3.1319 N-m**

At Mechanical + Electrical load TORQUE=0.33*5252/350

=4.9518 lb-ft. ~**6.7137 N-m**

2. FLYWHEEL

1. Pulley ratio(Motor: flywheel) :: 8:11

When motor on mechanical load Speed (RPM) of flywheel=**1032 RPM**

When motor on mechanical + electrical load Speed (RPM) = **482 RPM**

2. CAR ALTERNATOR

Pulley ratio (flywheel: alternator): 14: 5.5

When motor on mechanical load Speed (RPM) of alternator**= 2627 RPM**

When motor on mechanical + electrical load Speed (RPM) = **1226 RPM**

4.10 ADVANTAGES

1. Better utilization of available power.

2. Avoid penalty and disconnection of supply.

3. Cost of transmission, distribution and generation is saved.

4. Economical to install.

5. Easy and simple connection.

4.11 APPLICATIONS

1. Homes

2. Offices

3. Condition when electricity cuts off

4. At area where unavailability of electricity

5. Charging of batteries

CHAPTER 5

FUTURE SCOPE

5. FUTURE SCOPE

- Changing the Flywheel's weight, size, structure and speed, changes the output of the alternator.

- If higher specifications system is used such as 8HP motor, 150kg flywheel could produce 50% more free energy at the output alternator.

- Such high end system could extend the life of exhaustible non-renewable resources for more than 50% of its current life.

- Work in progess of overcoming the cogging and have continuous output.

CHANGES TO DO IN FUTURE FOR FURTHER ANALYSIS:

- Pulley ratio(Motor: Flywheel) :: 3:1
- Pulley ratio(Flywheel: Alternator) :: 5:1

CHAPTER 6

CONCLUSION

CHAPTER 6

CONCLUSION

Our investigation and the experimental analysis shows the satisfactory output at this stage. And is work is progress to reach the goals. An interesting future study involves the increase in pulley ratio to maintain sufficient alternator RPM to generate electricity. At present pulley ratio and PMDC motor rating, the output from alternator is for short time and due to magnetic locking the speed decreases which blocks the rotor of alternator and hence its generation. This cannot form the closed loop. In this trial and error analysis following observation is concluded.

Observation:

Weight of flywheel	Duration of output
3 kg	No output
10 kg	4 second
20 kg	8 second
35 kg	15 seconds

The future study and overcome on the error occurring in the project will conclude the efficient energy generation.

CHAPTER 7

REFERENCES

CHAPTER 7

REFERENCES

1. International journal of scientific and research publication, volume 4, issue 12, December 2014 ISSN 2250-3153 *'THE FREE ENERGY GENERATOR'* - By Mayan Grover, B.Lohith Kumar, Isaac Ramalla
2. DCM Manufacturing, inc - www.dcm-mfg.com
3. 'A Particle Guide To Free Energy Devices'- By Patrick J. Kelly
4. Balmar alternators- www.balmar.net
5. *'Electrical specification and selection guide'*- by Delco Remy
6. *'Mechanics of material'*- By Ronald Janco
7. Self-Generating generator- *https*://youtu.be/nAseG7z_GQo