RECIRCULATORY TYPE CHARGING SYSTEM (RTCS)

Prof. Praful Randive *1, Mukesh Gaurkar*2, Harshal Bhoyar *3, khilesh Patle*4, Bhupesh Patle*5, Ganesh Shelke*6, Sarthak Kamble *7

*1,2,3,4,5,6,7 Abha Gaikwad Patil College of Engineering, Nagpur, India.
Mechanical Department RTMU Nagpur, India.
Mechanical Department AGPCE Nagpur, India.

Abstract - In this paper we have studied the very simple type of charging system by minimum power loss and maximum output By the use of very simple mechanism, we can generate very high output of about the range of 75 volts only at the rpm of 400-500. as we have studied it is very effective idea to charge the vehicle as compared to the power loss when the alternator is connected ,in this concept the power loss is going to be very low and the special effect is that the power is going to be stored in the form of rotating drum like structured permanent magnetic the form of flywheel .The another concept is to give a direct supply to the electrical supply to electronics appliances of the electrical vehicle because of which the less batteries is required to give power motor .as a result of which the efficiency of the EV will increase and also the large amount of electronics , navigation ,entertainment ,and safety features will be added as in the normal fuel running car's . With this idea a great future of EV vehicle are visible in front of us.

Index Terms - Electrical Vehicle, Structured, research, Safety Features

I. INTRODUCTION

Electric vehicle (EV) has received an intensive attention and been deployed globally due to its beneficial characteristics including higher energy efficiency and lower environmental impacts. However, massive charging of EV leads to several problems to electrical grid because of huge amount of electricity demand and its fluctuation. Therefore, charging management for EVs is urgently demanded. In this study, a novel battery-supported quick-charging system is developed and its performance in single and simultaneous multiple EVs charging is evaluated. The objective of battery installment includes maintaining the charging rate and reducing the burden of electrical grid due to EV charging. In addition, charging behavior of EV under different seasons (winter and summer) is clarified initially. By the use of very simple mechanism, we can generate very high output of about the range of 75 volts only at the rpm of 400-500. as we have studied it is very effective idea to charge the vehicle as compared to the power loss when the alternator is connected ,in this concept the power loss is going to be very low and the special effect is that the power is going to be stored in the form of rotating drum like structured permanent magnetic the form of flywheel .The another concept is to give a direct supply to the electrical supply to electronics appliances of the electrical vehicle because of which the less batteries is required to give power motor. The EMF generated by Faraday's law of induction due to relative movement of a circuit and a magnetic Field is the phenomenon underlying electrical generators. When a permanent magnet is moved relative To a conductor, or vice versa, an electromotive force is created. If the wire is connected through an Electrical load, current will flow, and thus electrical energy is generated, converting the mechanical Energy of motion to electrical energy.

II. LITERATURE SURVEY

1. **Muhammad Aziza "Simultaneous Quick-Charging System for Electric Vehicle".**

Electric vehicle (EV) has received an intensive attention and been deployed globally due to its beneficial characteristics including higher energy efficiency and lower environmental impacts. The objective of battery installment includes maintaining the charging rate and reducing the burden of electrical grid due to EV charging.

2. **K.W.E Cheng "Recent Development on Electric Vehicles".**

This paper provides an overview of the recent work of electric vehicle in the region. The paper describes the development and the comparison of different part of components. The major components in battery technology, charger design, motor, steering and braking are examined. The paper finally shows some electric vehicle prototype as a conclusion of the papers.

3. **Lingzhi Jin, Peter Slowik "Electric vehicle consumer awareness and outreach activities".**

Sustained programs that utilize a broad range of outreach and awareness actions are more likely to capture a wider audience of prospective electric vehicle consumers. Local context and resources can be important in assessing the feasibility and effectiveness of an electric vehicle consumer awareness program.

4. **Collantes et al "New Vehicle Dealerships and Plug-in Vehicles: Workshop Summary and Insights".**

Maintain an adequate selection of at least 10-15 PEVs during peak demand; these cars should be in good condition, cleaned, charged and ready to drive. Featuring PEVs alongside collateral products such as chargers and solar canopies helps associate PEVs with buyer values such as oil independence and environmental friendliness.

III FORMULATION

The EMF generated by Faraday's law of induction due to relative movement of a circuit and a magnetic field is the phenomenon underlying electrical generators. When a permanent magnet is moved relative to a conductor, or vice versa, an electromotive force is created. If the wire is connected through an electrical load, current will flow, and thus electrical energy is generated, converting the mechanical energy of motion to electrical energy. For example, the drum generator is based upon the figure to the bottom-right. A different implementation of this idea is the Faraday's disc, shown in simplified form on the right.

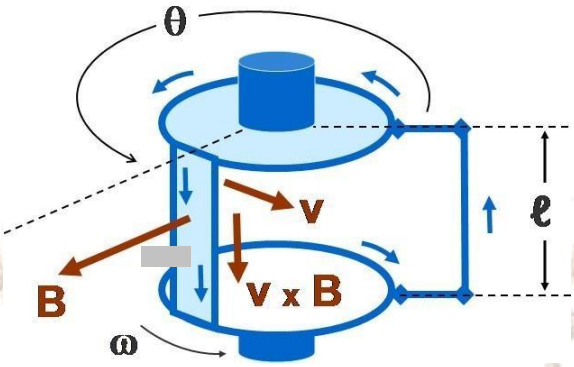

Fig.1: Induction Principle

In the Faraday's disc example, the disc is rotated in a uniform magnetic field perpendicular to the disc, causing a current to flow in the radial arm due to the Lorentz force. Mechanical work is necessary to drive this current. When the generated current flows through the conducting rim, a magnetic field is generated by this current through Ampère's circuital law (labelled "induced B" in the figure). The rim thus becomes an electromagnet that resists rotation of the disc (an example of Lenz's law). On the far side of the figure, the return current flows from the rotating arm through the far side of the rim to the bottom brush.

The B-field induced by this return current opposes the applied B-field, tending to decrease the flux through that side of the circuit, opposing the increase in flux due to rotation. On the nearside of the figure, the return current flows from the rotating arm through the near side of the rim to the bottom brush. The induced B-field increases the flux on this side of the circuit, opposing the decrease in flux due to r the rotation. The energy required to keep the disc moving, despite this reactive force, is exactly equal to the electrical energy generated (plus energy wasted due to friction, Joule heating, and other inefficiencies). This behavior is common to all generators converting mechanical energy to electrical energy.

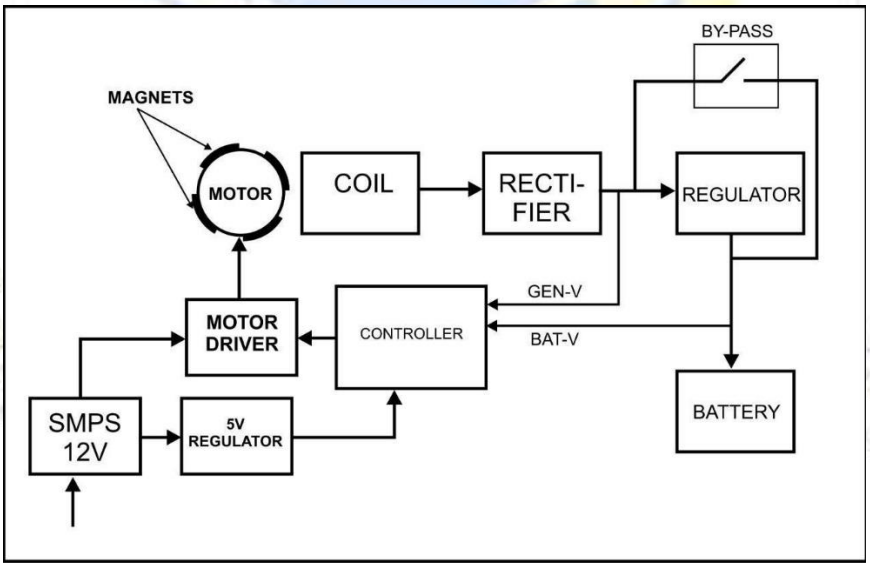

Fig. 2: RTCS block diagram

The block diagram of the RTCS system justifies 90% of the system and gives the idea of circuit. Is shows the flow of the charge in the system. Each of the element have their defined work and specified bellow in the component briefing part.
Concept based on electro-magnetic induction

IV PROBLEM DEFINITION

System under Study

As we have already conveyed earlier our project is the proto type of the actual project and we are creating the alternate for the very old process of the charging system we are preparing an approximate reading for the actual system. To clarify the actual electronic part is somewhat main thing to keep in our mind. It will take little more space and can increase the overall weight of the vehicle. But it is negligible and comparatively more useful and efficient for the vehicle customer and the vehicle.

Rather than this the energy generated with the RTCS can be used while camping and tripping in the special trucks and busses use for the particular purpose but it will need to charge the system again. The main problem in the system is it's only for the vehicle which runs comparatively more, more the vehicle run more the energy generated. The steady vehicle may cause the corrosion of the winding wire and can break the system. At some points the system is very delicate like eat output of the system the winding are mounted to collect the flux and also magnets are very brittle in nature.

This problem have very basic solution to give a guard to it.

V METHODOLOGY

To start of this project, a meeting with guide in the first week is done to manage the schedule of weekly meetings. The purpose is to inform the guide on the progress of the project and guided by the guide to solve difficulty. Briefing based on the introduction and next task of the project is given by guide. Make research of literature review with the means of the internet, books, available published articles and materials that is related to the title. Designing phase start of by sketching few model models using manual sketch on A4 papers. Do it comparison for choose the best concept. Software applications are downloaded from internet to design the model based on the sketches. Software Creo parametric 2.0 helps to draw the better dimension. The preparation of mid-presentation of the project is next. Before presenting, the guide will see through the slide presentations and comment on corrections to be made.

COMPONENTS UTILISED IN PROJECT

The main aim is to introduce the use of nonconventional energy source to run the mechanical machines rake is well known to all for its application.

The main components utilized,

- Dc motor
- Dc dry battery
- Armature
- Multimeter
- Magnet wire
- Magnets
- Metal rod
- Rectifier
- SMPS

SPECIFICATION

Motor :- DC Motor (12V, 1000 RPM)

(We required 1000 rpm that's why we choose above motor)

Frame :- 280mm × 280 mm

Card Board :- 450 mm × 450 mm

Drum :- Dia 110 mm

Joint Angle :- 15 mm

Nut Bolt :- MILD STEEL 305 Bed ,(Size- 4mm)

Ball Bearing :- 6001-2RS SKF Deep Ball Bearing with

Outer Diameter =10 mm

Inner Diameter = 5 mm

Power of motor =

P = V x I = 12 x 16.75

=201 kW = 201 x 10^3 W

T= $\frac{P \times 60}{2\pi N} = \frac{201 \times 10^3 \times 60}{2\pi \times 1000}$ =1919.40 N-m

= 1919.40 ×10^3 N-mm

Weight of drum

D = 110 ;t = 2mm ;L = 0.11 m

F = 0.59 kg = 5 N

Design of shaft,

∴Since the drum is mounted at center of the shaft, therefore max bending moment at the center of drum

M= W.L = 5×0.098 =0.49 N-m

Equivalent twisting moment

$T_e = \sqrt{M^2 + T^2}$ = 1919.40 N-m

$1919.40 \times 10^3 = \frac{\pi}{16} \times \tau \times d^3$

$1919.40 \times 10^3 = \frac{\pi}{16} \times 800 \times d^3$

D=4.96mm

Stress calculation =$1919.40 \times 10^3 = \frac{\pi}{16} \times \tau \times 5^2$

$\tau = 78.203 = 78.2003\ N/mm^2$

∴so max allowable stress is 80000N/mm^2 and stress induced on shaft is less compared to allowable stress.

∴Design is safe

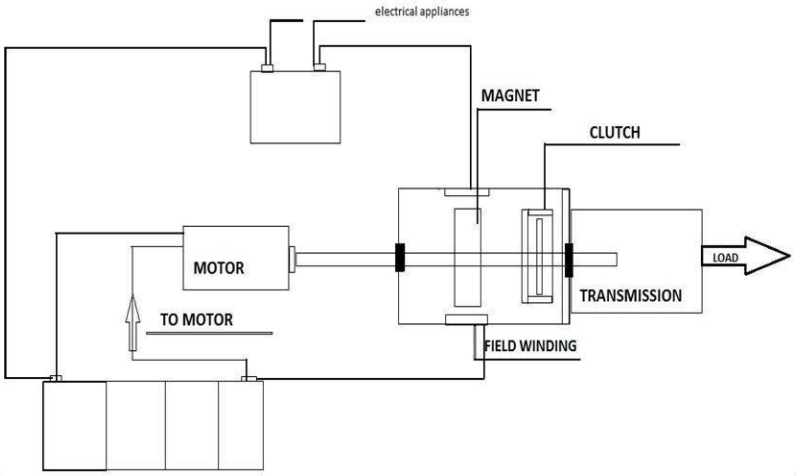

Fig.3 :- Actual lookout of RTCS

VI OBJECTIVES

The objective of this RTCS are:-

- The main objective of the RTCS system is to generate the charging system for the EV's and also getting a system ready electronic system tom manage the flow of the charging input to the required location.
- We have tried to keep the system simple to understand in which we are using the principle of electromagnetic induction .Taking reference from the Faraday's Law we generating a current and with the help of electronic system we are maintaining the amount of current ,maintaining flow of voltage ,and also the direction of that flow.
- The main goal of this work is to finally get it done with financially accessible channels. Finally, the planning of the system is simplified

VII RESULTS AND DISCUSSION

Time	RMP of wheel	Power produce
9.00	600	8KW
11.00	800	11KW
2.00	1000	15KW
4.30	1150	19KW

VIII CONCLUSION

By using RTCS we can reuse the losing power of the motor while it is standingstill comparing to the old or running concept of charging the electric vehicle.This will help to control the pollution in various ways. It will also help toincrease the efficiency of the electric vehicle and make it accurate.

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