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Electricity Generation Using Speed Breaker and Solar Panel

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Abstract:

In our daily life power becomes basic need for human life. Energy has been the necessary source for human survival. The energy can be neither created nor destroyed but it can be converted into different forms. The most of the electrical energy is being generated by using conventional energy sources but by the excessive use these conventional sources are depleting.so to satisfy the basic need for power we need to execute different methods and develop non-conventional sources which are eco-friendly. Vehicles have been a part of our life, The kinetic energy by the movement of vehicles over a speed breaker can be converted into mechanical energy using rack and pinion mechanism. Then this mechanical energy is converted into electrical energy by using generator. Therefore, large amount of energy can be conserved by this arrangement. Our project is to generate the energy and use it for Home Automation. We all prefer centralized control system over the conventional switch system.so home automation system using Arduino can be used. The loads can be turned on or off through sensors rather than by going to the switch and turning then on or off. this would be helpful for elderly people and also handicapped people. Generating electricity by speed breaker is very useful and ultimately can be used for different purpose here we are using this energy for home automation.

Keywords — Rack & Pinion,Energy Conservation,Speed Breaker

I. INTRODUCTION

Energy which is generated using the conventional forms gets eventually exhausted one day and they are also the cause of environmental pollution and also impacts human health. Most electricity today is generated using fossil fuels. The fossil fuels need to be transported which adds additional cost. Depending on the particular fossil fuel and the method of burning numerous gases like sulfur dioxide, nitrogen dioxide, ozone, are released into the atmosphere. Ultimately these conventional sources come to end one day we need different alternatives to satisfy the basic need of our power so we propose a nonconventional power generating system based on speed breaker mechanism. This also meets the criteria of not producing the polluting products. The fear of exhaustion can also be neglected as there are more vehicles now-a-days. The

growth rate of vehicles in India has increased almost 10 percent annually during the last decade [1]. After generation of electrical energy, it can be utilized for different purpose or uses so here in this project we utilized this for automation of home. As technology is growing there is need to adapt with the growing technology. The energy which is generated if not utilized properly the whole process is wasted. So, we need to utilize this properly to conserve the energy. the automation of home conserves energy. An automatically accessible environment is created so that we can control the appliances. The goal of this project is to develop a secure Home Automation system. People who are dependent on others can also control this very easily. Hence, we can accomplish both the generation and conservation of energy.

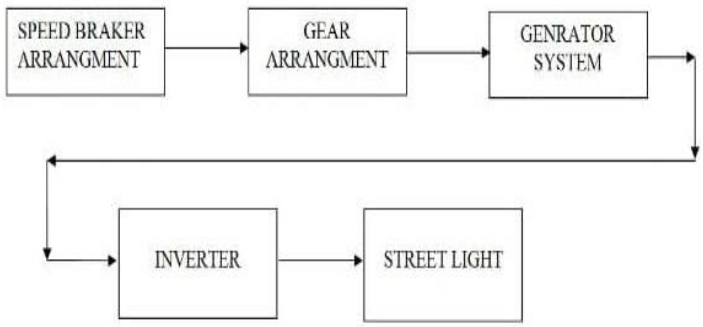
II. LITERATURE REVIEW

The speed breaker used is a roller type that rotates as the vehicle moves on it then the kinetic energy is converted into mechanical energy which is then converted into electrical energy, which means when a vehicle moves over a roller, the rollers are arranged in a way of free rotation and mounted on bearings on each side so the moving vehicle makes the roller rotate. The roller speed breaker is connected to a sprocket which is mounted on bearings. The chain drive is used to transfer the motion from a sprocket to gear which is used to drive the motor to generate electricity. As a result, we can see that if the speed of the car increases, then the speed of the roller also increases which helps in increasing the efficiency. [1]. The number of rollers used is 3 which are connected by a chain sprocket mechanism, to achieve uniform motion when a vehicle is passed over the speed breaker, the total mechanism is the same as explained before in roller type speed breaker as the kinetic energy is converted into mechanical energy which after is converted into electrical energy, but here it is mentioned the efficiency given by this speed breaker power generator is very low as the test is done by a two-wheeler and also mentioned that for a day the average number of vehicles passed on a speed breaker is more which automatically gives more efficiency. the fine advantage of this process is that the moving parts are less compared to other processes and also the maintenance cost is also less in this process we are able to reduce the maintenance cost by replacing the chain mechanism with a V-belt mechanism which will reduce the lubricating cost. And The amount of friction can be increased by providing the texture on the roller in order to make the fine rotational motions of the roller when a vehicle passes over it. [2]. The power generated by the speed breaker process uses the rack and pinion mechanism to generate the power. The kinetic energy of the car is converted to linear motion when the car is passed on the speed breaker and the linear motion of the speed breaker is converted to the rotational motion using the rack and pinion mechanism. since the moving parts are less its maintenance cost is less. The circular motion created by the rack and pinion mechanism is transferred to the chain sprocket mechanism and transferred to the DC motor which in result generates the electricity.

III. METHODOLOGY

The methodology involves installing a Speed Breaker Power Generation System equipped with piezoelectric sensors and energy storage to capture and store energy storage generated from passing vehicles which is then used for home automation purposes.

Iv. BLOCK DIAGRAM



v. WORKING AND PRINCIPLE

- Heavy vehicles can generate high torque and hence the power generated from them will be quite high.
- More suitable and compact mechanisms to enhance efficiency could be created.

- As these systems are installed on open roads, water accumulates in heavy rainfall regions which may be a threat for working of this system**.**
- So, waterproof system can be developed to use this system in heavy rainfall regions also.

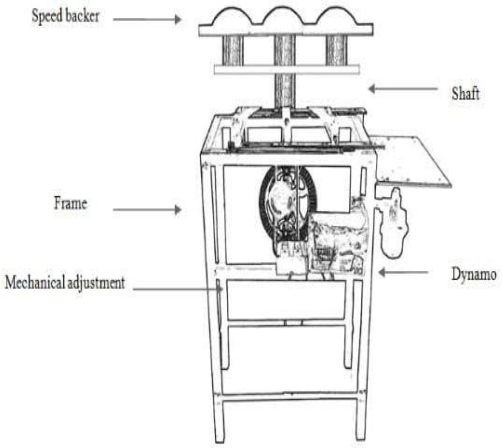


Fig.1 Design of Electricity Generation Using Speed Breaker

So, we see many vehicles on roads and as well as speed bumps for controlling the speed of the vehicles indicating speed limit on roads. The design of the speed bump is of special kind that is the speed bump is designed as a kind of suspension system. The speed bump is spring supported at both ends. So, whenever a vehicle or weight passes over the speed breaker the springs under the speed breaker takes the energy and gets compressed. During this process the speed breaker is able to generate the linear motion. As the rack and pinion mechanism is connected to the speed breaker the linear motions created by the speed breaker is taken by the rack and pinion mechanism. So that rack and pinion mechanism converts the linear motion to the circular motion. That circular motions are transferred to the generator by using the transmission system. The transmission system is may be of different kinds By automating the crop cutting process, the project reduces dependence on manual labor, thereby boosting overall efficiency and productivity. The machine's autonomous operation allows for extensive coverage of crop fields, significantly reducing cutting time.

VI. ADVANTAGE

- Will solve some of the electricity problems of the world.
- This can be implemented on heavy traffic roads and toll booths and can be used to power the street lights.
- It can be a solution the electricity shortage in most villages.
- The installation and maintenance is very easy.
- Energy available all year round.
- Maintenance cost is less.
- Free from all types of pollution.

VII. DIS-ADVANTAGE

- Required higher cost as battery.
- Required higher torque of motors.

VIII. APPLICATION:

1) In educational organization.

2) Use in road circle system.

3) In industries road speed blacker.

4) Can be used to village road.

5) It is used an traffic signal speed breaker .

IX. CONCLUSION

Electricity plays a very important role in our life". Due to population explosion, the current power generation has become insufficient to fulfill our requirements.

In this project we discover technology to generate electricity from speed breakers in which the system used is reliable and this technique will help conserve our natural resources.

In coming days, this will prove a great boon to the world, since it will save a lot of electricity of power plants that gets wasted in illuminating the street lights.

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