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May 28, 2021

Power Generation Using Rooftop Ventilator

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Abstract

This paper presents an innovative method of generating electricity by using roof ventilator. This paper deals with design and construction of the model. Presently there is technological development of applying wind energy for electricity generation. Roof Top Ventilator works on principle of natural convection. The main function of roof ventilator is to exhaust the hot air from industries, warehouse, buildings, houses, etc. And intake atmospheric air/ fresh air. Ventilation & lighting, both purposes are served by this model simultaneously which is important for improving working conditions of employees in factory. Such ecofriendly models are recommended for upcoming factories in order to mitigate effects of vitiated atmosphere because of lack of ventilation & lighting.

Introduction-

In future the generation of non-renewable energy may get reduces. So we can use renewable energy instead of non-renewable energy. These resources requires less

maintenance also they do not cause pollution. So we are using wind energy as a renewable energy source. Wind energy is a renewable energy which can be adapted for many uses such as water pumping, domestic air ventilation, and electricity generation, etc because wind is clean energy without any pollution to environment. To avoid problem & save energy we have new method Power Generation Using Rooftop Ventilator. Wind energy is one type of renewable energy & it does not cause pollution (except noise pollution). Therefore, development of applying wind energy for electricity generation. Wind energy is used to replace fossil energy such as oil & coal, causing environmental pollution. The roof ventilator system equipped with a small direct current electric generator. There are two types of rooftop ventilator motor driven & natural air driven. Here main component of RTV system are DC motor, battery, inverter, etc. This free electricity has to use to charge battery. By using this we can run small electric appliances. Here the electricity generated will be Direct Current (DC) but we can also get Alternating Current (AC) with the help of inverter.

Objective-

To develop roof ventilator with DC generator for electricity generation.

In this roof ventilator is work as vertical power turbine to produce electricity. Nowadays, there are many researchers who find the way to develop the air ventilation balls by using the ball to generate the electric current. There are external elements such as electric coils, permanent magnet, and small electric generator to install in the air ventilation ball. Or even adapt the air ventilation ball to move faster to stimulate the rotor.

New idea to improve ventilator speed an electrical production is to add additional fins.



Methodology-

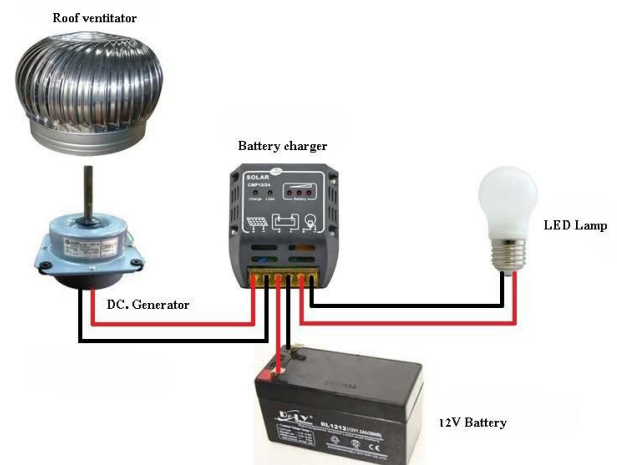
A Motor can convert this mechanical power into electricity. A wind turbine turns wind energy into electricity using the aerodynamic force from the rotor blades, which work like an airplane wing or helicopter rotor blade. When wind flows across the blade, the air pressure on one side of the blade decreases. The difference in air pressure across the two sides of the blade

creates both lift & drag. The force of the lift is stronger than the drag & this causes the rotor to spin.

This translation of aerodynamic force to rotation of generator creates electricity.

The research process of roof ventilator application for electricity generation are as below.

1. To design the air ventilation ball to generate the electric current, the concept was designed to modify the ventilated ball with the diameter 24 inches to install the 18 watts DC generator. The simple process and cheapest expense are considered, and the DC generator will also not close the ventilated holes. For further purposes, the DC generator is connected to ventilated ball and also connects to external battery charger to supply the electric current for Light Emitting Diode (LED) lamp as shown in Figure.



2. Install DC generator in the air ventilation ball and generator in the ball close to the axis. Put the gear in the proportion 1:4 to the air ventilation ball axis and rotor axis of the electric generator to allow the movement of electric generator axis while the wind blows the ventilation balls.

3. From the results of the invented air ventilation balls, the balls cannot generate the sufficient electric voltage for the batteries charger. So, the DC step-up converter must be added to increase the electric voltage. The DC step-up converter using a stable Multi-vibrator Circuit by Timer Integrated Circuit (IC) No. LM555 to create the square wave signal and bias to transistor for convert DC voltage from DC generator to the square wave signal. The high voltage square wave signal made by Step-up Transformer. And convert the high voltage square wave signal to be the DC voltage again by Bridge diode.

4. After this we have to use voltage regulator for regulation of voltage. For constant voltage supply for charging battery or supply to lamp. Before battery we have to use charging circuit for protection of battery. In case of high voltage supply the battery will get over charged which will damage battery for protection charging circuit is used. The power stored in battery can be used as supply for lamp.

Result-

The result of air ventilation is depended upon wind speed that air ventilation will electric current at wind speed 0.5 m/s. At maximum speed at 2 m/s, it will create approximate 3.5 volt of DC voltage.

When DC step-up converter is added to air ventilation found that DC step-up converter can make high voltage. The step-up converter is used for charging of 12V batteries.

Voltage from DC Motor	Voltage from DC step-up converter
1.0	3.56
2.0	8.74
3.0	14.35

Conclusion-

This Study is to adapt air ventilator to generate electricity. It is the use of wind energy for production of electricity in case if we required more demand of electricity. It can be used for backup purpose.

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Volume- 7 & Issue-0.2

ISSN- 2278-0181