



Research Paper

Realization of Fuel-Less Generator

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ABSTRACT

Utilization of electricity is a key tool for the development of every state or nation but much consideration must be given to the safety of life of the people when choosing method generation as several forms of such as hydro, thermal, solar, biogas and wind that uses water flow, fossil fuel, solar magnitude, wind strength to establish operation, nuclear and other method for producing electricity may produce environmental effect.

However, it is necessity to develop a system that can produce electricity at a considerable cost which is also safe to life of the people using and the environment involved. This research paper present an in-depth work on the realization of 1000W (1KVA) fuel-less power generator that operates on free of fossil fuel and produces an alternating source of power that support a load of 1000Kw. This method of generation virtually remarks as a smart system of power generation due to the fuel free, minimal noise, free pollution referencing to the requirement and materials involve compared to other such of power generation as mentioned.

KEYWORDS: Generator, Fuel-less, Electricity, Environmental effect, Power

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I. INTRODUCTION

The need for Power generation and distribution is vital for the has been an requisite factor in the progress of an economy, ranging from manufacturing, banking, media, health care, aviation, etc. Ulaby (1999) States that majority of the problems of Nigeria is traceable to the erratic power supply nature of the country, where many activities has been paralyzed due to the power outage. In the present time most power generation principles induce environmental pollution which leads to degradation or depletion of ozone layer is one of the major problems caused by the use of generator with fossil fuels. Increase in the cost of fossil fuel which has been one of the major prime movers in the internal combustion engine (ICE) has been noticed compared to the fuel-free power generation system. Consequently, it is for our great advance to design power generating set that will not make use fuel to produce voltage.

This paper presents the realization of fuel-less generator. It is a generator set that produces electricity without utilization of any fuel. The consists of the following component or sub system: 12V Battery to drive a 12 Dc motor coupled with an alternator, the A.C generator or alternator driven by motor produce 220V A.C output, at the output terminal a battery charger circuit is connected to continuously charge the input battery. These make it possible for the generator to answer the title fuel-less generator.

1.1 OBJECTIVES OF THE RESEARCH

The objective of this research proposal is to:

- Design and construct a fuel-free power generator that able to produce an alternating power of 1000watt.
- To introduce a new method of electrical power generation that would be accounted for less cost and technologically advancing system

1.2 STATEMENT OF PROBLEM

There is no doubt that generation of electricity using the fuelled generator prior to the cost of fuel produces/generates noise. For larger generators because size in proportion to the capacity need more space be

provided. This research proposes a fuel less generator that requires minimum space to be installed with less noise, simple in construction and free from fuel, and emission.

II. METHODOLOGY

The construction of this generator set can be split in to design and construction phase. In this phase the design for D.C motor, alternator, battery suitable for the system and the frame to house the whole system would be as follows:

III. CONSTRUCTION

In the construction phase the step by step procedure for the construction of fuel less generator is highlighted in parts:

Casing: This part provides support to all components of the fuel-less generator. It serves as housing for all component parts of the machine. A piece of angle iron 40mm x 40mm x 5mm will be measured and cut to sizes and weld together to make a stand of length 61mm, width 40mm and height 19mm; brazed at different points for regularity with angle bar of 1.5mm x 1.5mm

Motor And Alternator Base: A piece of angle iron of dimension mentioned for the frame is cut into length 21mm x 10mm and weld to the main frame to serve as the motor base

Similarly, a piece of angle iron dimension (1.5mm x 1.5mm) cut into length 20.5mm x 12mm and welded to the frame form the base for the alternator.

The plate of length of 60mm x 19mm will be cut into and weld to the frame to make up with the seat of battery and the self-charging panel of the generating set. A permanent magnet alternator is a power generating device that produces a sinusoidal output when a mechanical input to its hub or shaft is applied. This device is constructed very much like a brushless motor with the appropriate selection of insulation materials and winding to match the environment and application.

Alternator Design

Alternator used for this research work has the following nominal parameters as specifications; Voltage = 12V, Current = 5.3 A,

Speed = 6000 rpm,

Minimum speed for accumulator charging initiation = 1300 rpm.

They are produced in a variety of power and voltage levels and generally are always examined from many points of view, such as reliability, efficiency, dimensions, weight and costs.

Control Unit

This unit performs the following work; converts direct current (DC) to alternating current (AC), removal of ripples, and rectification.

The size of the alternator been used, will determine the capacity of the generating set.

Mathematically; $P = IV \cos\Phi$

Where,

P = Power output (watts) =?

V = Voltage (Volts) = 220

I = Current (ampere) = 5.35A

Cos Φ = 0.85

Therefore, the capacity of the generating set, $P = 5.35 \times 220 \times 0.85 = 1000W$

The alternator which is a small domestic generator has three output lead cables which supplies, the load, capacitor and the diode.

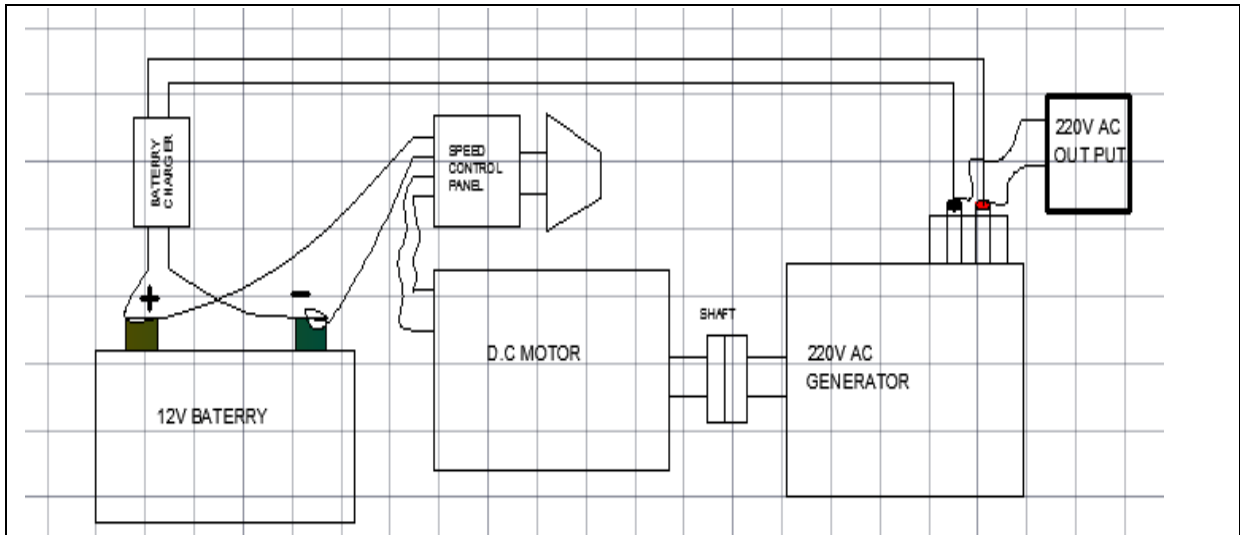


Fig. 1.0: Complete assembly of fuel-less generator.

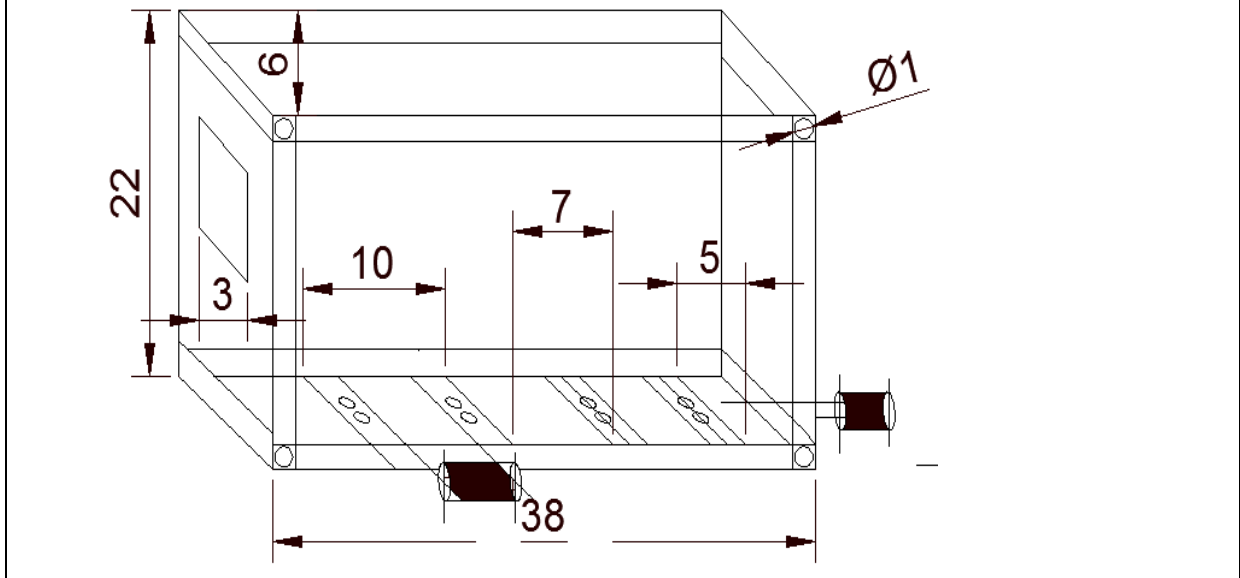
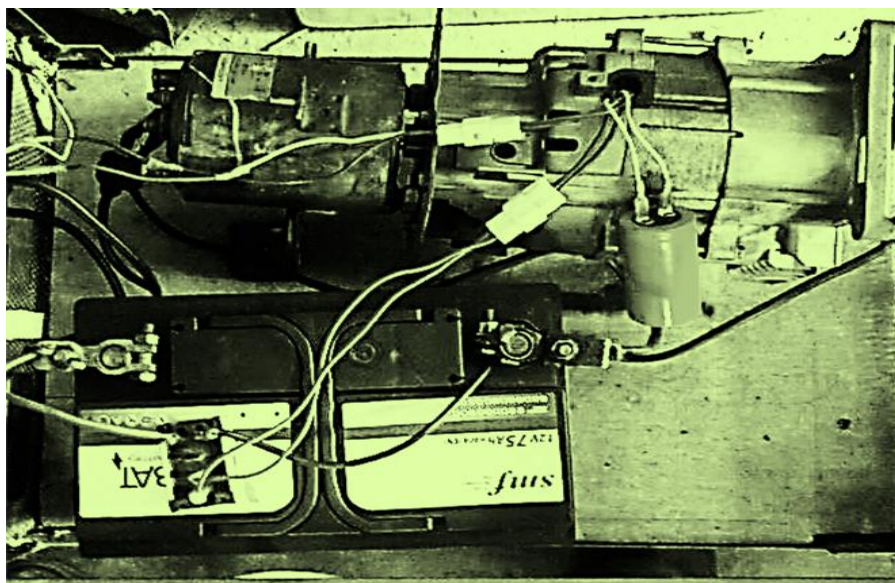


Fig 1.0 : the complete Assembly of the generator set.

IV. OUTPUT TEST AND RESULTS

The output test was carried out by first: A load of 800W and secondly a load of 100W. During the output test of the generator in the first when the load is high the speed was low subsequently when the load was replaced by small load of 100W the speed increases.

Therefore, the efficiency of the machine affected the output. The higher the load the lower the efficiency the lower the load the lower will be the efficiency. The pictorial view of the generator can be viewed below:



V. CONCLUSION

After successful test of the output as stated in the result we can conclude that this generator can be utilized effectively with high efficiency and produce voltage which is free from fuel and do not produce any hazardous waste to pollute our environment. For higher, a very high capacity motor and alternator can serve.

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