

## **INTRODUCTION**

A baking oven is a thermally insulated chamber used for the heating, baking or drying of a substance and most commonly used for cooking.

This project is as a result of increasing interest. Essentially, the idea, as demonstrated in an existing design, arises in the project students a feeling of motivation, and hence the search for a way to bring it to reality in a simple, yet intelligent design, like this. This project is designed to make the students utilize as many theoretical and practical concept as have been instructed in Alston to mechanical engineering workshop technology. Students are expected to learn and apply concepts, principles about energy specially the conversions of electrical energy to thermal energy, conduction and conventional heat transfer etc.

Also the determination of the properties of various ferrous and non-ferrous materials, electrical installation occurs. The application of engineering measurement and quality control.

Also to build an intellectual ability in interpretation of working drawing in designing and development before and after working process. Students will get an opportunity to appreciate safety, and the use of both machine and hand tools in the course of working.

## **THEORETICAL BACKGROUND OF PROJECT**

### **1.1 HEATING EFFECT**

Electrical cooker is an appliance that works basically by the heating effect of electric current on conductors. Sometime, this heating effect is an inevitable waste of power for instance, in transmission of electricity on power lines in which the voltages at the terminals is evolved due to the heating of electric current.

However, the heat produced by the flow of electricity is utilized by many or equipments used at home and industries some of the practical applications of the concept are found in electric cooker, electric oven, and electric space heater inexhaustible.

Heat which is a form of energy is transferred across a boundary of a system and given to another system or surrounding at a lower temperature by virtue of temperature difference between them. The heat is only identified across the system boundary (Welty et al, 1976). Heat is of great importance to man on earth for their daily needs. It is with that electricity is generated, food is cooked and houses are warmed.

Heat, by which electric oven operates on is generated by electricity of which materials used for the construction must have thermal capabilities and suitability to serve as heating element.

### **1.2 AIM AND OBJECTIVES OF THE PROJECT**

In food research, temperature is one of the variables that must be controlled at all times; household baking ovens are often used for this purpose. The aim of this study is to construct a baking oven used in baking. At the end of this project, student will be able to:

- (1) Compare the various ways used in the production of an electric baking oven.
- (2) Disclose the process in the manufacturing of an baking oven
- (3) Exploit the local facilities available in the construction of the oven as against imported ovens.
- (5) know the convenience in the use of alternate power source for operation of ovens.
- (6) Discover the basic principle involved in the design and maintenance of a baking oven.

### **1.3 PROBLEM STATEMENT**

Specifically, this design seeks for a source of energy that is relatively cheap and available, and therefore has an edge over other stoves and ovens using kerosine and gas as sources of energy. It also aims at making domestic cookers and ovens safe enough as against highly flammable liquid or gas fuel.

Many Nigerians today are faced with the problem of petroleum fuel scarcity and as per cooking and drying which is not often easy to get fire wood from forests that are often far away especially from the big cities.

Equally too, the few available fuels are of substandard quality with the attendant danger of fire outbreak.

In addition above, fuel consuming cookers and ovens have two outstanding deficiencies, namely; sooty pre-heating and problem of dogged nozzles which lead to offensive discouraging and dirty burning.

Above all, deforestation as a result of fire wood consumption is causing great deal of environmental problems in most regions of Africa. In this modern world and its various invented means of cooking, it largely seems as if non has quite addressed this area by providing an alternative means of cooking and drying.

In a close observation, large scale cooking and drying as an drying of meat and fish sellers, commercial corn roasters, food sellers and “suya” sellers, etc, need efficient heating system. The absence of short drying period and hygienic process of preserving our loide and sea foods is another issue, which has led to fast spoiling and give an electrical stove with an oven apartment to sufficiently address these problems.

### **1.4 PURPOSE OR OBJECTIVE OF THIS PROJECT**

This study is to devise a means of producing or cooking food with three apartment to address the following:

- (1) The problem of sooty pare-heating as observed in vaporizing cookers.
- (2) Economically, this equipment is designed for cost reduction and easy to maintain.
- (2) To reduce the effect of kerosine scarcity prevailing in our present days.
- (3) To meet up with inadequate availability of fire wood through deforestation.

### **1.5 SIGNIFICANCE OF PROJECT**

This project work is intended to serve as a catalogue and manual for the construction, installation, maintenance and repair of different possible faults in baking oven, it is also of a great benefit to the department and society as it will serve as medium of knowing the principle of operating the model work. It serve as an alternative means for cooking instead of using the gas oven, and the firewood.

### **1.6 SCOPE OF THE PROJECT**

There is no upper limit to the temperature obtained except the ability of the material to with stand heat.

### **1.7 DELIMITATION OF THE PROJECT**

1. There is freedom of location and general adaptability.
2. It entails good cooking condition, cleanliness, quietness and ambient temperature.
3. Uniform of temperature within narrow limit.
4. Capital cost, running and maintenance cost of electric oven are low.
5. There are no deposits of ash carbon dirt in an electric oven.

### **1.8 LIMITATIONS OF THE PROJECT**

Disadvantages in the use of baking ovens:

Cleaning and repair is a difficult and time-consuming endeavor.

Expect for mass production singular construction is relatively expensive to produce.

If precautions are not well carried out, it can result in fire hazard, which is dangerous to life and properties. Because baking ovens provides heat for one or more areas, the temperature may vary in different areas of the baking oven.

Oils and moisture collected on metal surface can end up trying to rust the metal coating if not clean regularly.

It is expensive to operate in high volume operations.

Speed seem to be the key factor and time taken to get to required constant temperature can be wastage of time.

Access to internal component in case of adjustment and maintenance is tasking as it requires an entire disassembling.

In case of mechanical faults resulting from shut down, an entire disassembling and requires is required.

Due to its function by heating, there is always a premature wear or mechanical failure of some of the internal component.

It cannot be used where there is no electricity, since it make use of electrical energy.

## 1.9 IMPORTANCE OF BAKING OVENS

In actual analytical enunciation an oven is an enclosed chamber in which things are heated or cooked with various sources of power.

Its importance borders around its function, which are as follows;

- (i) It is used to meet the everyday basic need of cooking, (baking, toasting, gritting, toasting) of food materials for human consumption.
- (ii) Ovens are used for heat treatment of substance in laboratories and industries.
- (iii) Also as a means of preservation by heat application to perishable materials (organic and inorganic) in general.
- (iv) Sterilization of instruments and equipment for industrial use is done by heat application using oven.
- (v) Expelling of moisture content to a required measure in some substance is also done using oven.
- (vi) Early manufactured ovens where used as a source of room heaters during cold weathers in cold climates.

Other importance boarding around its energy source is that the use an alternative source of energy when either fossil fuel or electricity is not available. This can be relatively save cost when necessitated.

## 1.10 DEFINITION OF TERMS

**THERMOSTAT:** This is an electrical device design to heat up bend and open the circuit when excessive current flows and close the circuit when the heat reduces. It can also be defined as an automatic regulator that control the amount of current that heat up the circuit.

**HEATING ELEMENT:** This is a conductor material that is designed to heat up when connected to current flow. It converts electric energy into heat energy.

**OUTLET PLUG:** This is an electrical device design with two or three metal pins that fit into holes in a socket

to make an electrical connection.

**SWITCH:** This is a device used to connect or break the flow of electric current in a circuit.

**INDICATOR (LAMP):** This is a device which glows like a bulb indicating the working status of a connection.

**CABLE:** A cable is a material or conductor use in conveying electric current from one point to another.

## **DESIGN AND CONSTRUCTION OF BAKING OVEN**

The complete project material is available and ready for download. All what you need to do is to order for the complete material. The price for the material is NGN 3,000.00.

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