

## HATCHING EGGS AUTOMATICALLY

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### ABSTRACT

There are noticeable requirements for egg incubators around the world in view of numerous elements. Egg incubation is a technology that provides opportunity for farmers to produce chicks from egg without the consent of the mother hen; it is also one of the ways of transforming eggs to chicks. Eggs have been incubated by artificial means for thousands of years. An automatic incubator needs to control four elements—temperature, humidity, ventilation and movement. Modern commercial incubators are heated by electricity have automatic egg turning devices, and are equipped with automatic controls to maintain the proper levels of temperature and humidity.

**KEYWORDS:** Egg incubator, Arduino, Temperature and humidity controller.

### INTRODUCTION

An incubator is an enclosed device used for conserving a living organism in a controlled environment. An incubation is artificial method to hatch the eggs. For this process incubation incubator devise is used. It allows to hatch the eggs without having hen. Incubation can be done by manually operated incubator and automatically operated incubator according to users demand. Electrical incubator is a device used for scientific incubation process in which temperature, humidity and other environmental factors can be maintained at desired temperature levels. For an egg incubator, it enhances the propensity of hatching eggs in mass. A great number of eggs can be hatched at a time while the layers(mother hen) can be free to lay more eggs there by resulting into high poultry production and low reduction in expenditure.

Egg hatching is an innovation that gives chance to agriculturists to deliver chicks from eggs without the impact of mother hen, is likewise one of the methods for changing eggs to chicks. The most vital distinction amongst common and artificial brooding is the fact that the natural parent provides warmth by contact rather than surrounding the eggs with warm air in case of artificial incubation. The developing chick in an egg is called an embryo, a watchful investigation of various phases of embryonic advancement will reveal numerous fascinating fact. Brooding of eggs will show you the impacts of warmth, air and moisture on hatchability. Present day electrical hatcheries are warmed by electricity, have programmed egg turning gadgets, and are furnished with programmed controls to maintain the best possible levels of warmth, humidity, an air exchange.

### SYSTEM DEVELOPMENT

**DHT 11 Sensor:-**DHT 11 sensor is generally a temperature and humidity sensor which has operating range is in between 3.3 v-5.5v . The main purpose of using this sensor is to measure the humidity and

temperature in an incubator .It has humidity measuring range is in between 20%-95%. Humidity measuring error is  $\pm 5\%$ . And it has temperature range is in between  $0^{\circ}\text{C}$ - $50^{\circ}\text{C}$  along with measuring error is  $\pm 2^{\circ}\text{C}$ .

**Lamp:-**An incandescent light bulb which delivers light with fiber warmed to a high temperature by an electric current going through it until the point that it goes . The hot fiber is protected from oxidation with a glass quartz bulb that is loaded with inert gas or evacuated. Incandescent bulb converts under 5% of the total energy they use into visible light with the rest of the energy being changed over into warm.

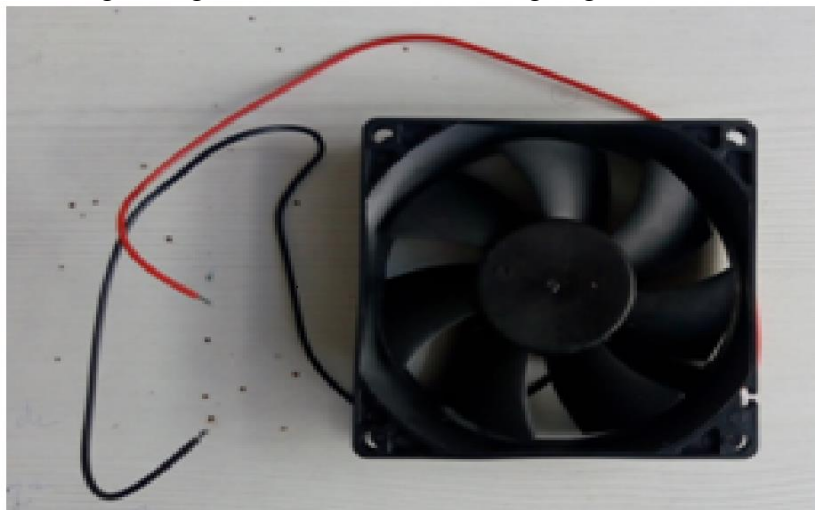


Photograph no.1:-Two incandescent lamp

The main purpose of using incandescent lamp in incubator is to serve heat to the hatchery to maintain the temperature in it.

**LCD:-** LCD (Liquid Crystal Display) screen is an electronic display module and locate an extensive variety of uses. A 16x2 LCD display is extremely essential module and is ordinarily utilized as a part of different gadgets and circuits. These modules are favored more than seven fragments and other multi segment LEDs. The reasons being: LCDs are economical; effectively programmable; have no confinement of showing unique and even custom characters (dissimilar to in seven portions), animation and so on.

**Fan:-**A mechanical fan is a machine used to make stream inside a liquid, regularly a gas, for example, air. The fan comprises of a rotating arrangements of vanes or cutting edges which follows up on the liquid.



Photograph no.2:- Fan used for ventilation

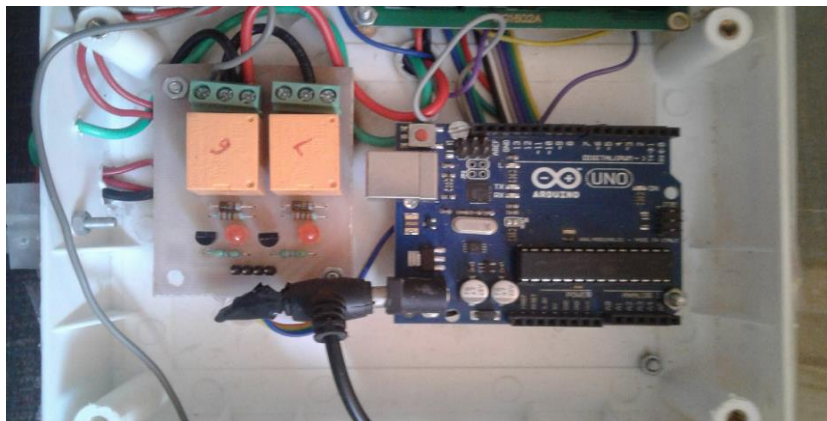
The rotating assembly sharp edges and center point is known as an impeller, a rotor, or a sprinter. The significant unction of fan in a hatchery is to cool or course warm in the framework

**Relay:-**Relays are electromechanical device that utilize an electromagnet to work a couple of movable contacts from an open position to a closed position. The benefit of relay is that it takes a generally little amount of energy to work the relay coils but the relay itself can be utilized to control motors, lamps, etc.

**Geared Motor:-**

Direct current geared motor with low speed is used to rotate egg stand at 45° angle so that it will automatically change the position of egg to avoid the embryo sticks onto the shell.

**Arduio:-** Interfacing of arduino with relay and LCD helps to get desired result. As relay works on the principle of electromagnetism, when the relay coil is stimulated it acts like a magnet and changes the position of a switch. The circuit which controls the coil is totally segregated from the part which switches ON/OFF, This gives electrical isolation. This is the reason we can control a relay using 5V's from an Arduino.



Photograph no.3:- Interfacing of Arduino with relay

**System Performance-**The working is based on two relays and control of the incandescent lamp, fans, humidity and temperature sensors and turning mechanism in incubator. At the point when the Arduino is turned on, it initializes the LCD . The LCD is initialized in order to display the temperature and humidity value in the incubator. As the ideal temperature for egg incubation is 38°C so Arduino constantly checks the value of temperature which is sensed by the DHT11 sensor. When the temperature exceeds optimum range then the relay will turned off the incandescent lamp and auxiliary fans will turned on. When temperature goes below the optimum range then the incandescent lamps will turned on. As the humidity required to hatch the eggs is 55-60%.By utilizing vaporizer humidity in the incubator is maintained. When the humidity underneath the ideal range then vaporizer will turned on till the humidity becomes equivalent to ideal range else it will remains off.

To prevent the embryo adhere to the shell egg turning mechanism is implemented for initial 18 days of incubation and turning will be off for remaining 3 days by using switch. Turning is adjusted by using JOHN geared motor which has 12 KG torque and has rating 10 rpm and turning mechanism is set at 45° as per requirement.

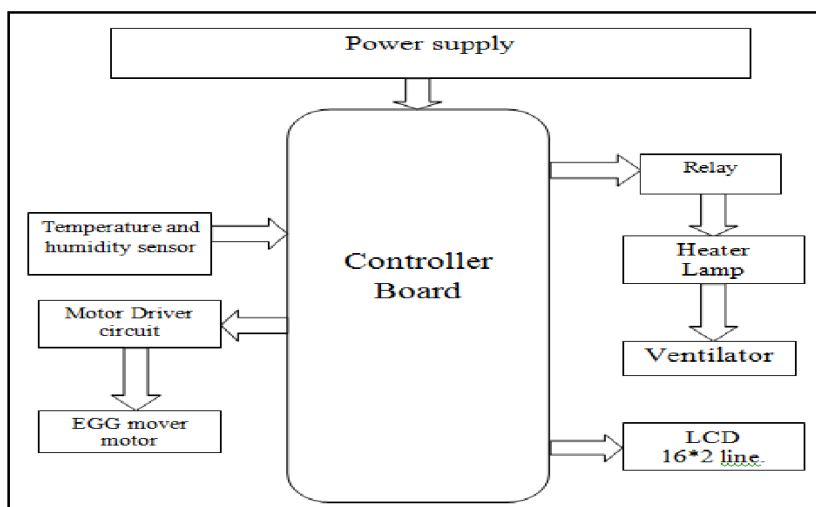


Figure no.1: Block diagram of “hatching eggs automatically”

## RESULT

The result of this project is by using artificial incubator many chicks can be hatched at a time in a short while.



Photograph no.4:- Hatching eggs automatically

Another thing is that it is possible to plan when to hatch the chicks unlike with the hen one may not know when it can sit for the eggs. Chances of eggs spoilage are minimized since all eggs are subjected to the optimal hatching temperatures. There are no chances of the hen damaging eggs through pecking, a common occurrence with natural incubation.

## CONCLUSION

The egg incubator has been built to be simple in construction and handling. This compact incubator machine endeavored to repeat the state of natural hatching. The exact estimation of temperature would be shown on the LCD screen. With the working of two relay and control of incandescent lamp, fans and turning mechanism a well-organized design of a hatchery is executed. The compactness, sensitivity, reliability and simplicity of operation of the device proved the instrument to be a dependable tool to farmers in poultry creation.

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