SAFETY FROM ELECTRIC WATER HEATER BY USING SENSOR AND RELAY CIRCUIT

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Abstract

The main theme of this paper is safety from electric rod (electric water heater). The water is less than minimum level in the bucket, the electric rod doesn't get turn on. If unexpectedly anyone came near to the electric rod(bucket) it gives the alarm and turn off the power supply to the electric rod. And it gives the alarm at the same time, why because to know the who are went near to the electric rod. The main advantage of this paper is to eliminate the electric shock from the electric rod (provide the safety from electric rod).

Keywords: Heater, Relay Module, IR Sensor, LED Indicators, Buzzer and Rectifier Circuit**.**

I.   Introduction

The electric heater is a very dangerous, why because sometimes the body of heater is getting electric shock due to heating element touch. At that time anyone unexpectedly touches the water or heater they may get the electric shock.[1][2] To avoid this one the sensor is connected to the heater through the relay, when anyone came near to the electric heater the sensor detects and give the signal to relay then the relay will be triggered, turned off the power supply and gives the alarm.[3][4]

Some people are not fill the water in bucket (i.e., minimum water level), this is cause huge dangerous, to avoid this problem the heater will turn on when the water level is minimum level.[2] Otherwise, the heater not get on until the water level is less than minimum level.[1]

II. Proposed System

In the proposed system, the human beings are protected from the electric water heater through the relay and sensor circuit. Most of the people not pour the proper level (minimum level) of water at that time the electric water heater not getting On.

In every home most of cases children are present, that time they went near to the electric heater, the sensor will detect and gives the alarm and turn off the power supply to the electric heater and gives the RED Led glowing indication.

The reason behind this work is provide safety from the electric heater while it is in running condition. Sometimes children are unexpectedly going and touch that heater they get effected, so it is very helpful at that time.
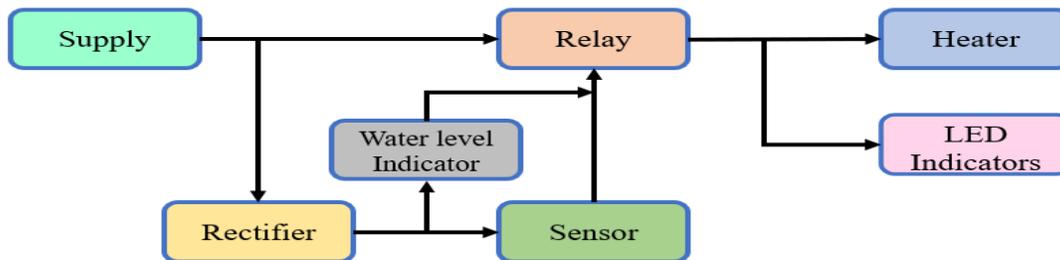
III. Block Diagram

Fig.1. Block Diagram.

IV. Hardware Components
A. Electric Heater

An immersion heater has an electrical resistance heating element closed in a tube and directly placed in the water (or other fluid) to be heated. The nichrome wire is used for converting electrical energy into heat energy.

Fig.2. Electric Heater.

B. IR Sensor

An infrared (IR) sensor is an electronic device that measures and detects infrared radiation in its surrounding environment.IR is invisible to the human eye. There are two types of infrared sensors i.e., active and passive. Active infrared sensors both emit and detect infrared radiation. Active IR sensors have two parts: a light emitting diode (LED) and a receiver. When an object comes close to the sensor, the infrared light from the LED reflects off of the object and is detected by the receiver.

Fig.3. IR Sensor.

C. Relay

A relay can be defined as a switch. Switches are generally used to close or open the circuit manually. Relay is also a switch that connects or disconnects two circuits. But instead of manual operation a relay is applied with electrical signal, which in turn connects or disconnects another circuit. Electromechanical relays are frequently used.

Fig.4. Relay.

D. Rectifier Circuit

A regulated power supply circuit converts unregulated AC into a constant DC. With the help of a rectifier, it converts AC supply into DC. Its function is to supply a stable voltage to a circuit or device that must be operated within certain power supply limits. The output from the regulated power supply is always DC.
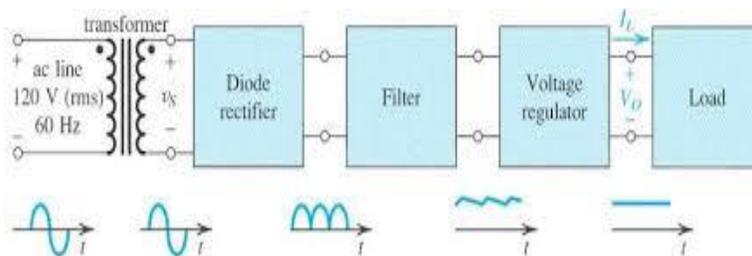

Fig.5. Rectifier Circuit.

5. LED Indicators

A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor. LEDs have many advantages over incandescent light sources, including lower energy consumption, longer lifetime, improved physical robustness, smaller size, and faster switching.

Fig.6. LED Indicators.

6. Buzzer

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.
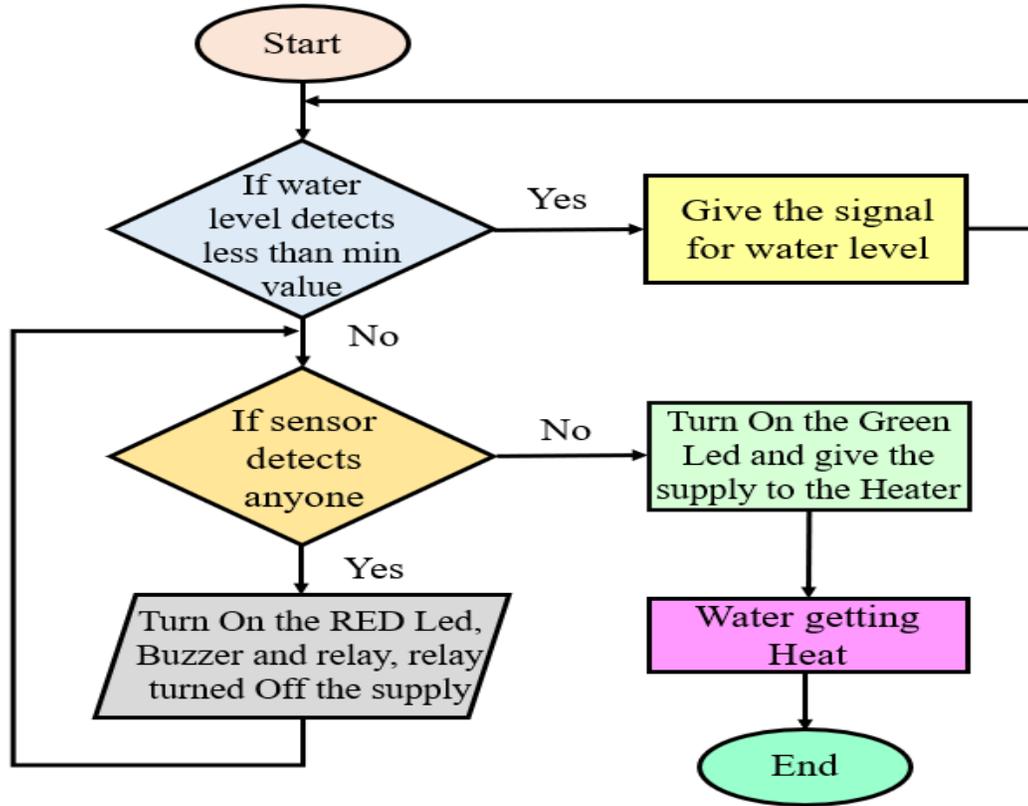
Fig.7. Buzzer.

V. Flowchart

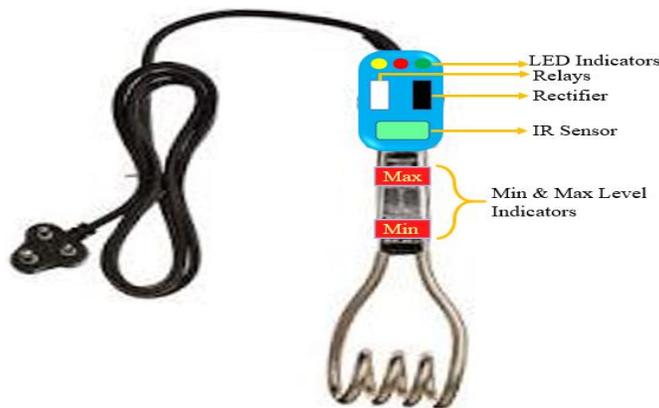Fig.8. Flowchart.

VI. Working

Fig.9. Working Model

The electric water heater is used for to heat the water by using electricity, the heater converts electrical energy into heat energy (high resistance nichrome wire).

In this process when electric heater immersed in the water bucket, the heater will be turned on when the water level reach minimum point. Because it is very dangerous heat produced in water level is less than minimum.

When the heater is running condition any one came near to the heater then the sensor will be detecting and dive the signal to relay, then the relay turned off the power supply to the heater. And it gives the alarm sound and turned on the red led indication for danger.

This process will continue until the sensor will detecting off. Because children don't know what will happening there. In case they went near to the heater, it will protect from the electric shock.

VII. Results

Fig.10. Results.

VIII. Future Scope

This paper is upgrade to when the water gets heat up to preset value then turns off the power supply. It is very economical why because in this heating proses there is no power wastage.

IX. Conclusion

The main advantage of this paper is to avoid the overheating of electric heater due to low water level. Minimize the electric shocks during running condition (turned off the power supply), and gives the alarm for knowing someone is there near by the heater.

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