

Automatic Digital Control of Electric Iron

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Abstract:

This paper represents automatic digital control of temperature of electric iron which are basically uses a temperature sensor and low power microcontroller. The electric switch TRIAC is used to control temperature of an electric iron which controlled by microcontroller. The steam of the electric iron can control by based on heating of electric iron. This will provide effective control of temperature and will improve the life of cloths.

Keywords: Electric iron, switch, temperature controller, triac.

1. Introduction

The electric steam iron consists of a water-containing chamber and distributing arms which are supposed to ensure uniform distribution and delivery of water to the trap chamber. The trap chamber is the one which prevents the escape of water and only allow the steam to pass through the various channels for dampening the cloth in the ironing process. There is an inlet pipe which provides water to the system along with a movable handle which can be moved to increase or decrease the water flow. With the supply turned 'on', the heating element heats up which further heats the body portion as well as the bottom plate of the iron since the heating element is interposed between the body part as well as the bottom plate. With a slight opening of the valve, water enters the trap chamber leading to generation of steam which is directed to the channels for dampening the cloth to be ironed [1].

The smoothing iron has the ability to be heated by the steam passing through a flexible steam tube connected to the back end of the iron and it provides means for controlling and independently cutting off the steam communication. Asbestos is secured on the inner side of the cover plate for protection from heating and a number of perforations are being used to allow discharge of steam through the channels to the cloth being ironed. By applying pressure on the lever, the valve is raised and opened and steam passes from the tube to the neck and through to the steam channels to the perforations for dampening the cloth. When dampening is not required, spring is used to lower the valve and to close the same to prevent possibility of steam entering the neck so as to cut the steam communication with the perforations [2].

The iron consists of a water and steam chamber where water is placed through a filler opening and closed by means of a plug. This iron has introduced the concept of a safety valve which can be used to deliver steam either to the material which is to be ironed or to the atmosphere in case the arrangement attains a pre-determined steam pressure so that the cloth can be ironed either 'dry' or 'damp'. There is a plate which is used for determining the adjustment of the member contacts for the degree of heat required in ironing different kinds of materials. The water container is first filled with water and then the electrical circuit is established by connecting the cord to a suitable outlet and turning the knob from 'off' to 'on' positions. This energizes the heating element which heats the sole plate, the heat will be distributed to the water within the

container and cause generation of steam which by moving the handle can be used to iron the cloth either 'dry' or 'damp' [3].

The iron consists of a container and a large number of baffles which are meant to provide protection against the surging action of water. The heating element is provided with a plug which is connected to a source of power for supplying current to the element. The container is filled with water depending on the height of the baffles by removing the filler cap and then it is again closed. Then, the current is applied to the terminals which heats the heating element which generates the heat for allowing it to pass through the perforations. After the water is heated to the boiling point, the steam rises in the steam chamber which is used for steam communication with the clothes. During the ironing movements of the iron, the water within the container is withheld by means of baffles which are used to prevent surging action of the water [4].

2. Hardware Design

Since many years we have used electric irons but today in the age of power electronics we have used power electronics devices instead of conventionally mechanical switches. In this digital electric iron, we have used a power electronic switch instead of Thermostatic switch (Mechanical switch) to maintain a constant temperature. We have used a relay receiving controlling signal from Arduino when temperature goes out from the range of the set temperature. In future with the advent of newer technology we can completely make the iron fully automatic. The implementation of automatic digital electric iron requires a programmable digital controller, relay circuit or power electronic converter, a temperature sensing circuit.

Every cloth needs a different temperature for its proper ironing and that temperature has to be constant because temperature above set temperature may result in burning of the cloth and temperature below the set temperature may result in inefficient ironing. Thus, the ambient temperature for particular cloth has to be set carefully by having various set of readings.

The prototype model of the digital control of an electric iron is shown in figure below. It uses a relay switch which is controlled by Arduino uno microcontroller board. The temperature sensor detects the temperature of cloth instantaneously. If the actual temperature of the cloth more than the reference temperature, then controller will generate a command to cut-off the supply. As the time progress, the temperature of electric iron reduces and if it demands more temperature as per cloth then automatically controller will switch-on supply.

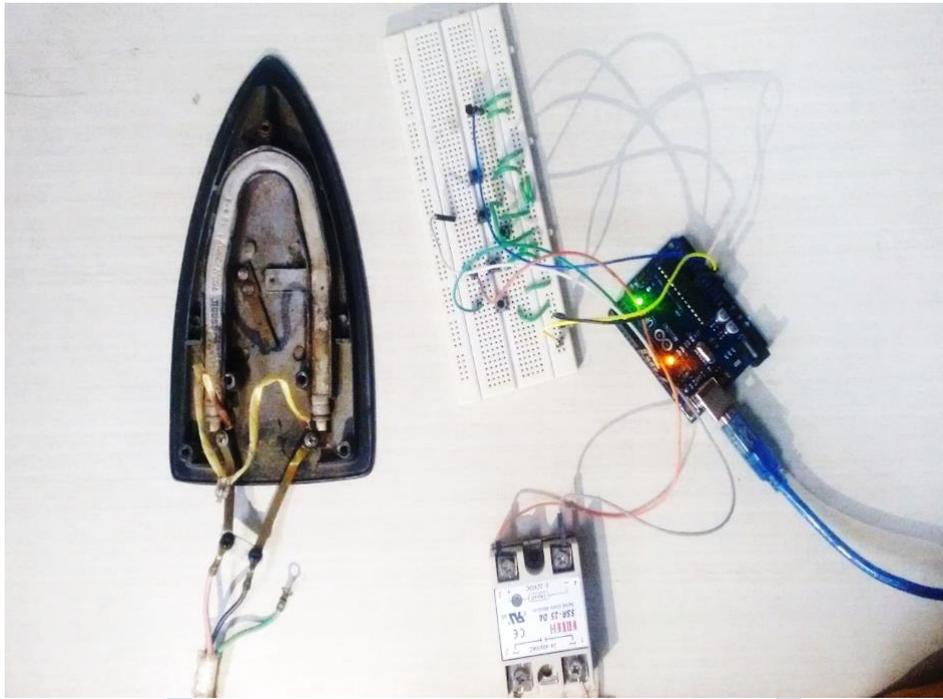


Figure 1. Prototype model of digital controlled automatic electric iron

3. Conclusion

The prototype model of the automatic electric iron is designed. The product is not fully functional with lack of sensing and poor designing of the circuit. It is quite difficult to sense the automatically type of cloth. It will add more cost. The automatic control of steam of the electric iron is not shown.

References

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