A Table Prototype Idea for Dining Using Peltier Effect

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Abstract- *We have produced prototype ideafor dining purpose and convenience of dining. In this design we can havewarm food and cold beverages at the same time while having dinner or lunch or at any instance of time. We can keep food warm and beverages cold for a longer period of time with this prototype idea using Peltier effect. It provides us convenience as there is no need to get up from the table for making the food warm or getting the cold beverages. Using this table can give you more benefits like a good quality family time while dining. This table is useful for household usage or hotel industry.*

Keywords- Peltier Effect, Cold, Hot, Beverage, Dining.

I. INTRODUCTION

Main components that will be used for constructing this table will be:

1. Peltier(Semiconductor Device).
2. Computer fans.
3. Table.
4. Ice box.
5. Heat conducting pan.
6. Current Controller.

II. INFORMATION ABOUT COMPONENTS

Here there are certain functions and specifications that should be considered while designing this table.

1. Peltier(Semiconductor Device):

   This is a Semiconductor device which heats up from one side and cools from other side. The peltier should be mid sized because it will have the capacity and surface area required for the application.

2. Computer Fans:

   Here computer fans are used to transport the cool air as well as hot air towards the required destination on the table.

3. Table:

   This is the main component where all the setup will be installed on.

4. Ice box:

   We use a ice box because we can provide an additional storage for beverages under the table.

5. Heat conducting Pans:

   These are the pans which will be heated to keep the food warm until the time of dining.

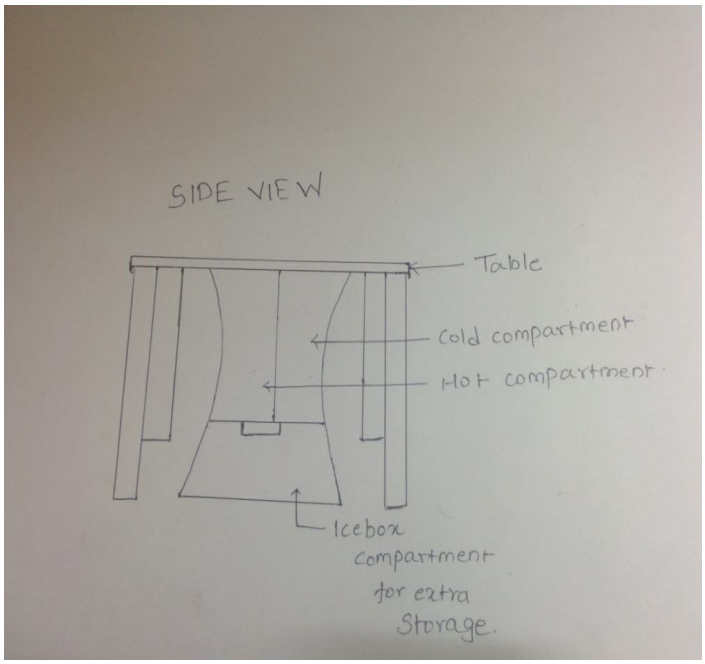
6. Current controller:

   This is used to control the flow of current through the Peltier for achieving the exact temperature needed to keep food warm or cold as per requirement.

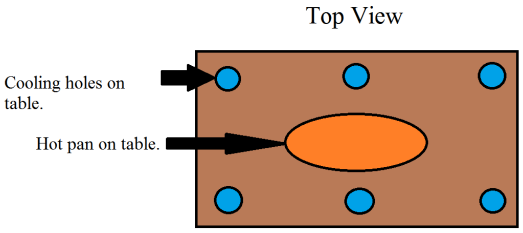
III. WORKING

We need a table for this application and installation of this system. The system is simple to assemble. We install the Peltier device under the table. We create compartments for the flow of hot and cold air simultaneously via computer fans that will blow the hot and cold air simultaneously, respectively. We drill out holes on the table, big enough to keep the bottle or the glass or the utensil on it and enough air can get in contact with it to keep it cold. We install a central rotating pan which will be used to keep the food warm. The pan will get warm by the air that will be blown by the fans from the Peltier device.

Ice box is an additional part which will be installed at the bottom which can be used to keep the beverage bottles or food cool and can be taken out whenever needed. It will be connected to the cool compartment of the Peltier device. The figure below shows the design of the table.



Fig(1).Side View



Fig(2). Top View

IV. ANALYSIS

Peltier should be medium sized and 12V 9A. We can adjust the current flowing to obtain the maximum effect. The required supply should be 12V 9A.

We would need two computer fans , one for hot side of the peltier device and one for the cold side of the peltier device. They will also do the work of supplying the hot air and the cool air to their respective destinations through the respective compartments.

The table can be of any size as we can create as many compartments as we want for cool side and can have a bigger heating pan at the centre. The size of the table doesn't matter in this designing.

As stated before, the ice box is the additional part. We use it as a cool storage for keeping the beverages or food that we require later on. The size here too is not a major issue as it will be under the table at the bottom which will be connected with the cool compartment.

Heat conducting pan should be sensitive to minute changes of heat and adopt that temperature when the hot air will get in contact with it. It will be mainly used to keep the food kept on it warm. The size of the heating pan will be dependent on the size of the table. The larger the table, the lager will be the heating pan and vice versa.

V. CONCLUSION

This system requires just a power outlet and when you turn it on we can see the results of heating and cooling when the Peltier heats and cools and the computer fans send the cold and hot air to their respective destinations.

The cooling and heating can be controlled by controlling the current. The heating and cooling are related to each other in terms of current. 12V- 9A is the full capacity of the device where we get the maximum heating temperature and the minimum cooling temperature. But we can control these temperatures by controlling the current flow through the device.

The basic need for this system is comfort of the people who will use this system. The people need not go anywhere when there will be a storage compartment under the table at the bottom. We need not worry about the cooling of our food and keeping our food warm enough as we like it.
The pans play a major role of warming up the food kept on it. It depends on the temperature of air received on the pan via fans from the peltier device's hot side panel. The holes that we drill out for cooling will be enough to cool a glass or a bottle or the vessel that needs to be cool.

The compartments will be closed from all sides which will not make the person feel the excess heat of cold when they sit on the table for dining or any purpose.

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