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Environment Friendly Air Conditioner Design Using Cooling Pot and Solar Panel

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Abstract— Basically, Cooling pot is a portable version of an air conditioner. It is basically a environment friendly design made up of terracotta clay in which aluminums pipe and some cooling slices are used. Cooling pot is an air conditioner that uses to cool the air up to 8-10 degree Celsius by using some basic environmental concept that reduces the usage of harmful gases like chlorofluorocarbon etc. The model works like a blower blow air from the pot full of water and that water makes the pipe cool that helps to cool the air. The device is available in market with normal ac voltage source but we are trying to use it by using the solar energy that reduces the usage of electricity in our homes.

Keywords— Environment Friendly, Air conditioner, Design, Cooling Pot, Solar pannel, Cooling slices, Aluminium pipe, Working

I. Introduction

By using clay to chill things naturally is a low-tech method that's been known and used for centuries. The Cooling Pot is basically a terracotta pot with a permeable surface that acts as a heat switch, with an aluminium pipe to transfer the air and a fan to move the air through the air conditioner. The Cooling Pot works by absorbing water from the inside and transfer it to the outer surface. Once it comes into contact with the air, this water evaporates, and it is this change from a liquid to a gaseous state that cools the inner aluminium pipe, where air circulates inside the pot. Apart from the natural evaporative cooling function, the internal pipe of the Cooling Pot also contains aluminium “cooling slices,” and these are power by an electric blower. There is a wide mouth in the bottom of the pot through which it takes the air and where it is cooled. This natural air conditioner requires very little maintenance, since it uses only two liters (approximately half a gallon) of water to decrease the temperature of the air to 8 to 10 degrees Celsius. The Cooling Pot is of course powered by electricity, but it uses less power than your regular AC unit. We are also trying to make it use like free of cost by using it with “solar energy” which is really cheap source of energy. Moreover solar energy is the only source of energy that you can easily get from the environment and also there are no restrictions to use it, Infect it is also helpful for our future generation to use it efficiently and it also prevents nonrenewable resources and we easily get rid of the electricity problem. While it probably won't cool very large spaces, Cooling Pot is a no-extra-ordinary thing but effective design that draws its inspiration from tried and tested traditional methods of keeping it cool. We also try to increase the cooling capacity of this device by using some large fan in it or by giving extra power supply (by increasing

the voltage rating of fan). More cooling capacity gives us more benefit that a normal sized room can be easily cooled and a small room can be cooled faster than its earlier speed.

Fig. 1. Cooling pot [1]

II. RELATED WORK

Thibault Faverie named a guy worked on the device and he named it cold pot. He gave his great theory on it but we tried to improve the quality of this project. The project was made at ECAL University by this guy. And now we are making this project more efficient by using a high power blower and I also trying to use this device on solar energy which is quite different and more efficient concept. These are the basic points which make our research different [1]. A significant amount of vigor is used by latest buildings in urbanized countries. According to their research they are working on a special type of building in which they using some special techniques to build the walls of the building to keep the building cool. But we are working on the project to make a device to cool the buildings without using harmful gases and electricity [2]. The installation of air conditioners for getting comfort in homes, offices and public places are using large amount of energy continuously and giving a peak to environmental pollution. They are using some solar techniques that helps to reduce the temperature of the building or anywhere it installed and solve some environment problem. But our concept is totally different. We are making a natural air conditioner that does not consume electricity and not exhale any harmful gas like CFC. So it is also environment friendly project [3]. The concept of [4] is almost same as [3]. And they added a thing that PCM material i.e. Phase Changing Material that helps to maintain the temperature of that particular building, office or anywhere it is installed. We really appreciate the work but we are trying to make the device not the building having these type of walls to cool the environment. And their concept is very costly as compared to cooling pot [4]. The matter in this reference is the combination of reference [3], [4]. So there is no need to explain the matter again. But our solar technique is quite different as compared to this idea [5]. Their concept is quite new and appreciable. In this they are trying to reduce the temperature by using some harmonical oscillations at a regular interval of time which give thermal comfort to the area. There is proper dimensions of the slab and the

material they are using here in this project. But my project is quite different like we work on a device to that helps to cool the environment without using any harmful gases. And moreover it helps to decrease the usage of electricity as it is on solar energy [6]. The main motive of our work is to achieve thermal and energy efficiency [7-9].

III. WORKING

For the working of this model I would like to explain the basic structure of the cooling pot. The outer portion of this device is made up of clay and inside it consists of aluminium pipe in which we are having an electric fan and some cooling slices made up of aluminium which is powered by the fan. And it has bolt shape stand at its bottom.

Fig. 2. Parts of cooling pot [1]

Now, we want to put some light on its working. It is based on the concept of evaporation. The first thing we have to done to use this is that we have to fill the pot with water. The porous surface of the terracotta pot acts as a heat transfer agent; it brings water from inside the pot and delivers it to the outer surface. Due to its contact with atmosphere, the water evaporates and this evaporation results in the cooling of the pot and as well as the inner aluminum pipe, where air circulates. So in addition to the nifty evaporative cooling function, the interior pipe contains aluminium "cooling slices" that are fanned by a small electric fan. Hot air comes in through a wide mouth in the pot's bottom and is cooled as it passes through the pot's interior pipe.

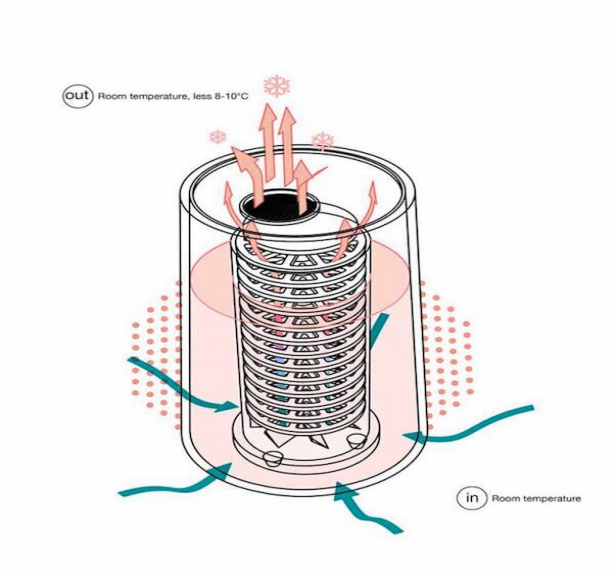

Fig. 3. Working of Cooling Pot [1]

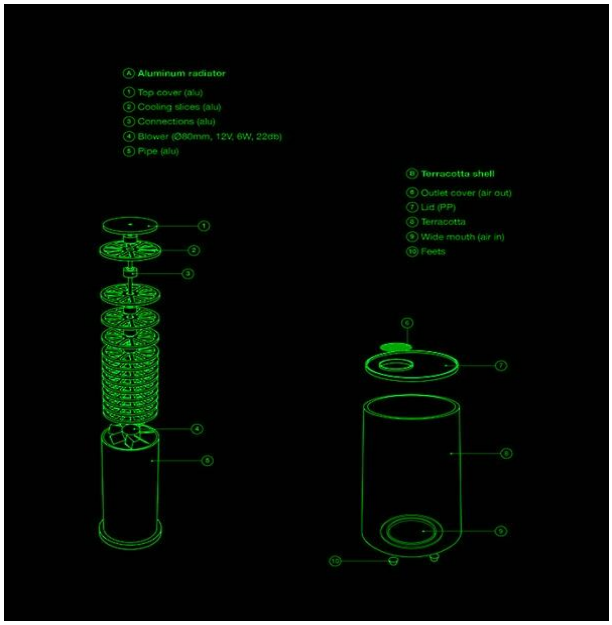

Fig. 4. Functioning of cooling pot [1]

This device is ultra low-maintenance, using only two litres (half gallon) of water to lower the temperature of the air 8 to 10 degrees Celsius (14.5 to 18 Fahrenheit), according to the designer. And the new feature we are adding to it is that we trying to use it on solar energy. We are using a high power fan in it to increase the cooling capacity of the device.

IV. CONCLUSION

The result of the project is quite clear that the device is really an appreciable thing that it reduces the usage of harmful gases like CFCs etc. The concept we used is working very good like the concept of evaporation and the cooling slices used to cool the air is also great ,And moreover it is a compact version so it is easy to move from one place to another. And its low price is like cherry on cake.

V. FUTURE SCOPE

As the model is still under research so we are trying to increase the cooling capacity of this device by using some large fan in it or by giving extra power supply (by increasing the voltage rating of fan). More cooling capacity gives us more benefit that a normal sized room can be easily cooled and a small room can be cooled faster than its earlier speed. This great change makes this device more popular among the crowd. We are also trying to use it with the help of solar energy which also gives a plus point to this device and moreover it will be cheaper device that works like a cherry on cake. We hope that the Cooling Pot will be a great product in the market.

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