

DESIGN AND FABRICATION OF 360 ° AIR COOLER AND HEATER

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Abstract –

To develop the energy efficient, environment friendly direct evaporative air conditioning and forced heating system having low operating cost suitable for hot and dry regions and climates. To manufacture advanced 360-degree rotating air cooler & heater which rotates and provide air cooling and heating in all directions. 360-degree design air cooler & heater will allow person to sit in any direction during winter for heater and cooler for summer. Simple 360-degree evaporative cooling is achieved by direct contact of water particles & a moving air stream. When a hot and dry air is allowed to pass through a wet cooling pad, the temperature of incoming air is reduced with an increase in specific humidity as some water from the pad is evaporated taking the latent heat of vaporization from the incoming air. 360-degree heater, is forced convective heater that has an electric fan to speed up the air flow

Key Words: *Evaporative, 360° air cooler and heater, vaporization, thermal conduction, heating and cooling, low operating cost.*

1. INTRODUCTION

The Evaporative cooling is one of the foremost styles employed by men for conditioning their houses. It's a process of air when a spray of water is made to 360 EVAPORATIVE into it without transfer of heat from or to the surroundings. The original investment cost of such a system is low & the operation is simple & cheap. Simple 360 EVAPORATIVE cooling is achieved by direct contact of water patches & a moving air stream. However, dry air will come more sticky & will drop in temperature, If the water is circulated without a source of heat & cooling. The air may be sufficiently cooled by 360 EVAPORATIVE process to results a considerable degree of summer comfort in climates of high dry-bulb temperatures associated with low relative moisture's. The minimal out-of-door temperature needed for successful 360 EVAPORATIVE cooling is over 35 ° c & another demand is a fairly low.

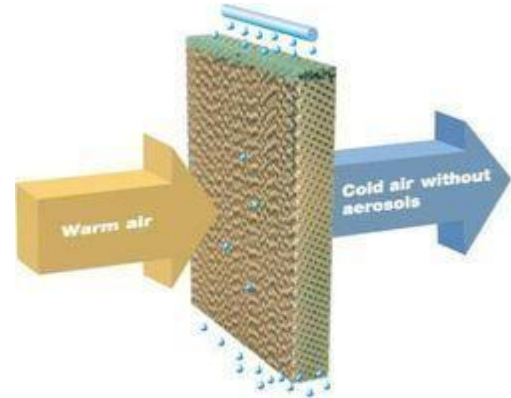


Fig. 1 : Direct evaporative cooling

Mortal always tries for better comfort and complication at each position of his life. Considering 360 ° air cooler is used in dry climates. Air exertion in moment's world has a vital significance. Considering mortal comfort, it's necessary to study and do inquiries on the content of 360 ° air cooler cum heater, in order to make it more provident and effective. The comfort given by the 360 ° evaporative cooling always depends upon the out-of-door temperature & relative moisture. Always gives further comfort with 360 ° cooling. Heater is process of hotting forced air with the help of heating coil. The heater made of pristine sword the heating element heats the air in contact with it by thermal conduction and as including hotting coil make it useful indeed in when wet bulb temperature is high and indeed if relative moisture is high. Hence, the effectiveness of heating coil remains nearly constant. Air purifying is also done in 360° Air cooler and heaters. One further reason for the use of 360° air cooler and heater is reduction in global warming.

2. LITERATURE REVIEW

Prof. Satish Markad, Vishal Nathile, Faizan Qureshi et.al [1] In this research paper suggested to reduce electricity consumption for refrigeration cum air conditioner, air cooler and water cooler, also save water and forest which are affected a great impact to maintain an ecological balance and to make it cost effective, so normal person can offer this product. Environmental groups and governmental agencies have cooperated over the last two decades to bring about reductions in refrigeration and air conditioning systems energy consumption and refrigerant emissions.

Bhupendra Sahare, Chavvikant Shahu et.al. [2] In above research paper we learned, Mathematically of the proposed cooler utilized for air cooling has been developed by writing equations of energy balance for the various parts as well as give the details of the parts for selection as per requirement in the cooler. They give the information about design the cooler with minimum cost and space and give determination of the consumption as compared to the domestic cooler.

R N S V Ramanakanth, C.Lakshmi Sindhuja, J. Emeema et.al. [3] In these research paper it shows that the portable air conditioning system satisfies the need of the user at the most economical cost. The portable air conditioner is having very low manufacturing and maintenance cost. Its cooling power is comparable to wall air conditioner.

3. OBJECTIVE

- To develop and design the air-cooling system having low cost and allowing people to sit anywhere as their comfort and preference.
- To develop the Energy efficient, environment friendly direct evaporative air conditioning system having low operating cost suitable for hot and dry regions.
- To reduce bacteria and viruses present in atmosphere with the help of nano layer of titanium dioxide (TiO₂).
- As compared to normal conventional cooler we add kind of fragrances in air cooler.

4. PROBLEM STATEMENT

Moment due to global warming temperature is rising. So, to maintain this increase in heat we use different air-cooling systems, Air Cooler is one of the conventional systems used worldwide. As we want the air coolers which are available in request are not important smart. So, to overcome this problem we are in this design 360° EVAPORATIVE cooler design.

We developed and fabricate our air cooler to make it low functional. The overall cost is affordable to everyone. It's eco-friendly, doesn't produce pollution. This Air Cooler inventories air without adding moisture compared with conventional air coolers. 360° directions will allow sitting people anywhere. This air cooler will cool the air in all directions, named as 360° stir AIR FLOW COOLER with binary side air inflow.

5. COMPONENTS OF AIR COOLER:-

- **HEATER COIL** - The air passing through the cooling pad is cooled below its dew point and therefore get dehumidified and again passing over the heater coils the dehumidified air gets hotted up and therefore its relative moisture drops.
- **FAN** - It's used to shoot cooled air to terrain. Material of addict both side carpeted iron.
- **RECIRCULATING PUMP** - The pump in the cooling system of a cooler that causes the water to circulate. The pump is mechanical device used to circulate the fluids from bottom to top. Power 18 watts Affair 3litre/ min.
- **WATER STORAGE TANK** - It's used to STORE the water needed for cooling STORAGE capacity 40 litres.

Design Of 360° Air Cooler And Heater :-

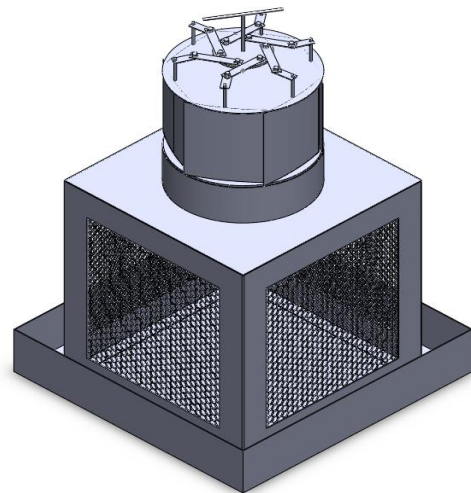


Fig 2:- 3D View Of 360 Air Cooler & Heater

6. WORKING

The working procedure of 360° air cooler and heater is very simple. Principal behind this cooler that cooling effect is obtained due to evaporation of water i.e., when hot air with low relative humidity meets air latent heat is absorbed by water and phase change of water takes place and hence water gets converted to vapor which is carried away by air and due to this effect temperature of air reduces and its relative humidity is increased. In this cooler air will enter cooler through all four directions which will be sucked in by fan provided, while entering cooler the outside hot air will flow through cellular pad on which water will be sprinkled this is where

evaporation of water takes place and cooling effect is achieved then this air is passed through canal to baffles which is then supplied in 360° direction by baffles.

Water is sprinkled on cellular pad with the help of pump provided in sump. Cooler is used in summer. While in winter and monsoon where high temperature is required for human comfort as ambient temp is low at such time heating coil is used to increase the temperature of air. This cooler is provided with a switch when the switch is on heating coil gets no power supply as power supply is given to pump for carrying out cooling process, but when ambient temperature is low and the demand is to increase the temperature then turn switch off so the power will be supplied to heating coil instead of pump and as water will not be sprinkled air will follow the same route but instead it will be heated by heating coil.

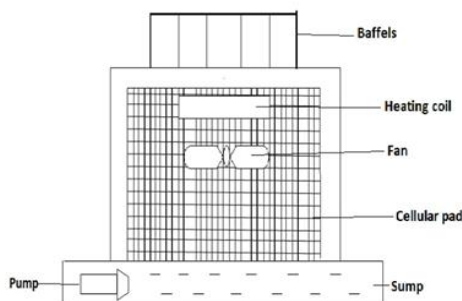


Fig. 3 :- Block Diagram



Fig. 4 :- Actual Image

7. FUTURE SCOPE

If a dehumidifier is added at the bay of a cooler will increase its effectiveness. And it will also enable to use this cooler in condition when relative moisture of air is high. The cooling range of cooler can be varied by changing the fluid, but it can also affect in adding the cost of cooler.

1) We can install thermostatic expansion stopcock for bus cuts off for the heater coil, so that the temperature of the heater coil can be set at the needed and the asked value as per the temperature conditions.

2) We can regulate the capacity of the cracker addict by installing potentiometer so that as per the demand the inflow of air can be regulated.

3) The water position index can be installed so that the position of water can be fluently detected and maintained.

4) The tank material can be replaced by pristine sword to save it from the environmental erosion and corrosion.

8. CONCLUSION

Through above research paper and model, it is good to conclude that 360° cooler and heater can cool air up to 10° to 12° due to evaporation of water while at the same time if heating coil is used it can increase the temperature of the air by 5° to 8°. And this system cost much low as compared to regular air conditioner. It also has an advantage of saving the natural resources as it works on natural phenomenon and it is pollution free.

9. REFERENCES

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