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DESIGN AND DEVELOPMENT OF WATER COOLING AND AIR CONDITIONING SYSTEM

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ABSTRACT:

Temperature control always plays an important role in industrial processes. Many processes are dependent on the accurate temperature range if that temperature is not maintained then the total process is affected. This finally results in poor quality of final product. Some machines produces huge hit and hence it is necessary to reduce their temperature with some external arrangement as continuous heating may results in failure or breakdown of the machine. The air conditioning in the houses is another application of the air-conditioning which is very popular now days. The normal temperature range is increasing day by day with lots of pollution created through different sources. Need of cool air and cold water is always there in households and many functions. Present system has two sources for these applications while we have developed as design to fulfill these needs with single machine. This machine will reduce the requirement of space and electricity consumption. The CAD design of cooling and refrigeration system is presented and discussed in detail in this paper.

KEYWORDS: Refrigeration, Air conditioning, Condenser, CAD, Cooling, etc.

INTRODUCTION:

The temperature is increasing in summer every year. In India many areas are making records of high temperature in summer year by year. In India, during summer season, the average temperature is around 45°C. To maintain comfortable conditions in summer season various appliances like air conditioners, coolers and fans are used. The cost of such appliances is sort of high which is beyond reach of consumer. These appliances also consume heavy electricity which results in the high electricity bills.

Also, during summer season everyone needs cool air and cold water for drinking purpose. So, to be comfortable during this season we'd like cold water and funky air. To fulfill these requirements, we'd like to get two different appliances one for cooling air and other appliance for cooling water. Also, space required for installation of these appliances is more. Innovation and modification are the nature of engineering. Hence, we've introduced “Designing and Developing Combined device for air and water cooling. Main purpose of our project is to supply both of those facilities that's cool air and cold water in single unit and to supply this unit at affordable cost for common man. This unit is found suitable for the household and other commercial places such as halls, corporate offices and industries etc.

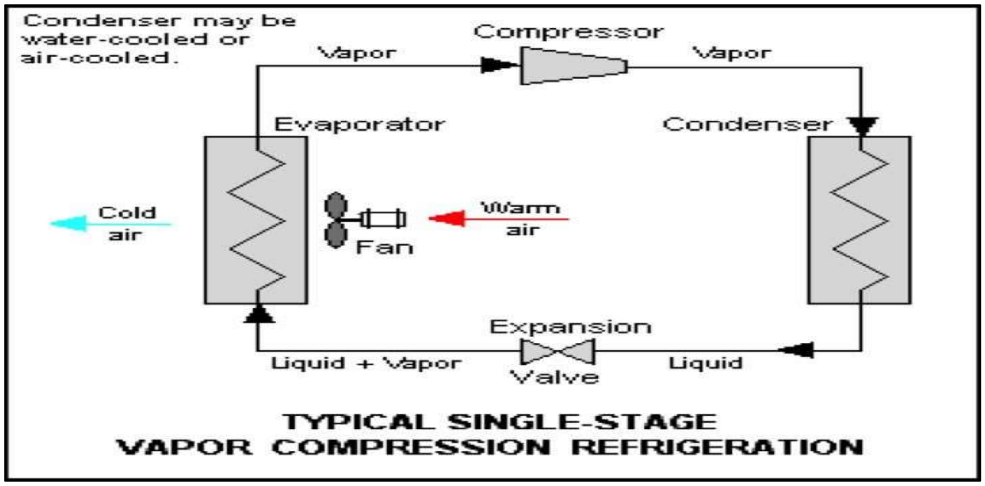


Fig.1: Typical Single Stage Vapor Compression Refrigeration System

A refrigeration cycle of the vapor needs to use compressor, condenser, valve and evaporator. The system absorbs the heat and provides the cool air for reducing the temperature of the area under cooling.

MOTIVATION OF WORK:

Space availability becomes a big problem with cities developing and the population increase in cities with many people moving in the cities every year. In summer season there's need of cool air and cold water. Hence, we require two separate units that's air cooler and water chiller or refrigerator. Hence space requirement is more and also the value is higher. The need is to develop a special machine which is useful for the cooling of water and air both. It helps in less space requirement and the consumption of electricity will be reduced which makes it very effective. This will be the economical unit for the household as well as the offices.

OBJECTIVES OF WORK:

The aim of this study is to design, construct and evaluate a combined water cooling and air conditioning system for normal Indian people. The study also compares cost effectiveness for different units such as water cooling and air conditioning system so that the best option can be chosen.

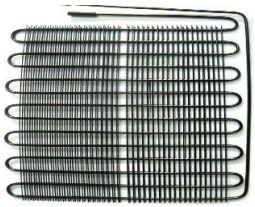
Aims and objectives are estimated below:

1. Minimize the cost of purchasing.
2. Reduce Space of installation.
3. Saving energy consumption.

SYSTEM REQUIREMENT:

Table.1: Specifications of main components

Sr. No.	Component Details	Picture of the Component
1	Compressor	

2	Condenser	
3	Expansion Device	
4	Evaporator	
5	Blower	
6	Silica Gel Membrane	
7	Temperature Sensor	

SYSTEM DESIGN:

The system is designed in CAD software to realize the modifications as below:

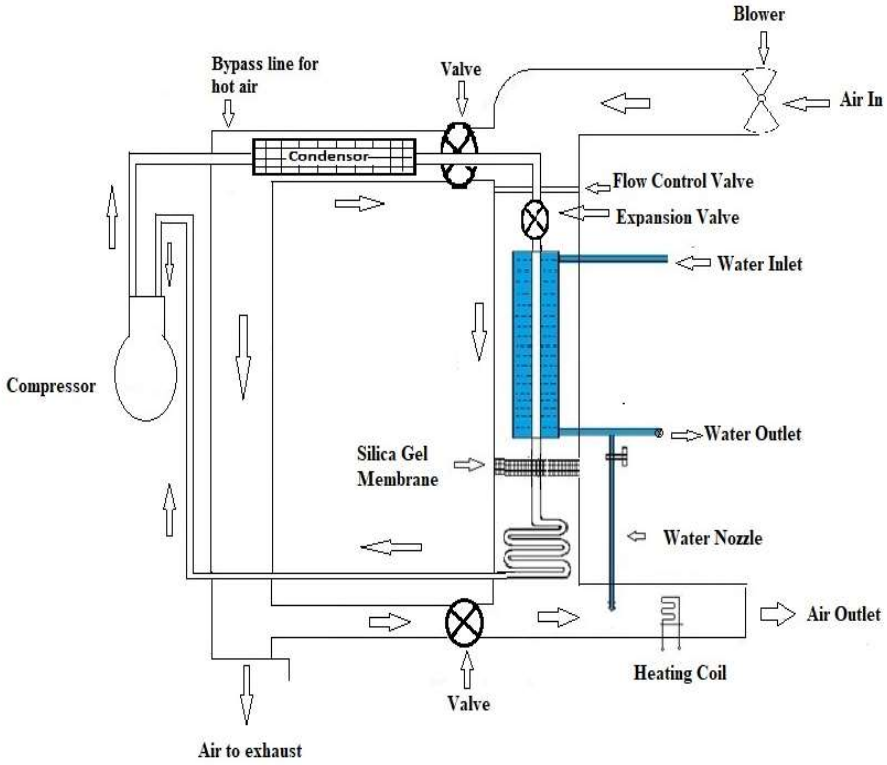


Fig.2: Basic Diagram of Combined Water Cooling and Air Conditioning System.

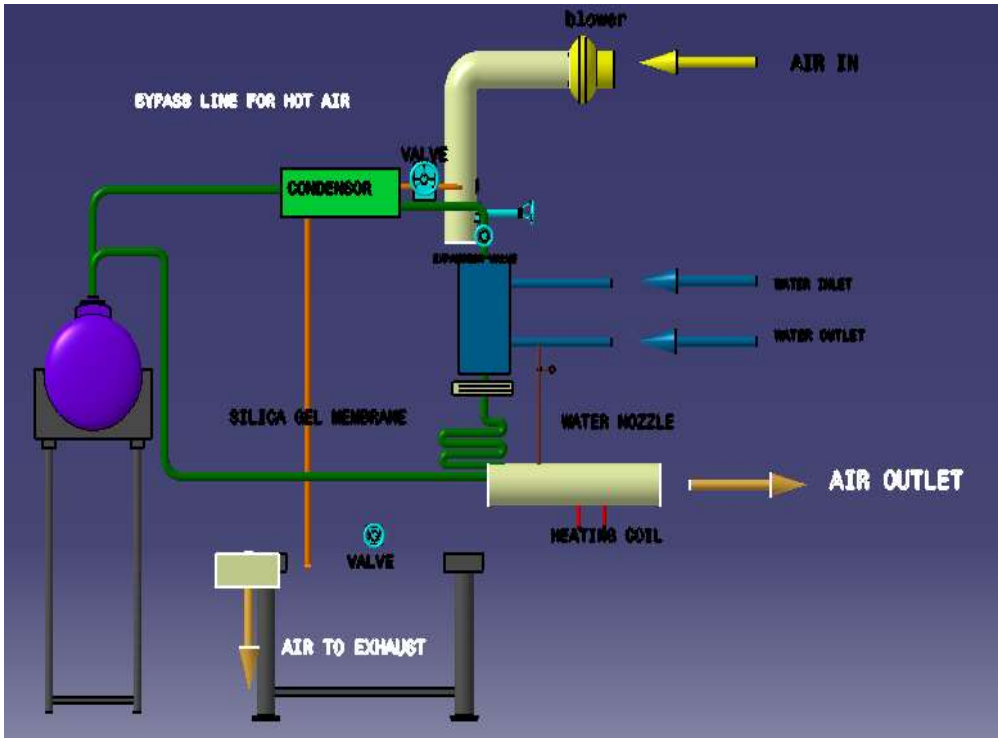


Fig.3: Internal View of System

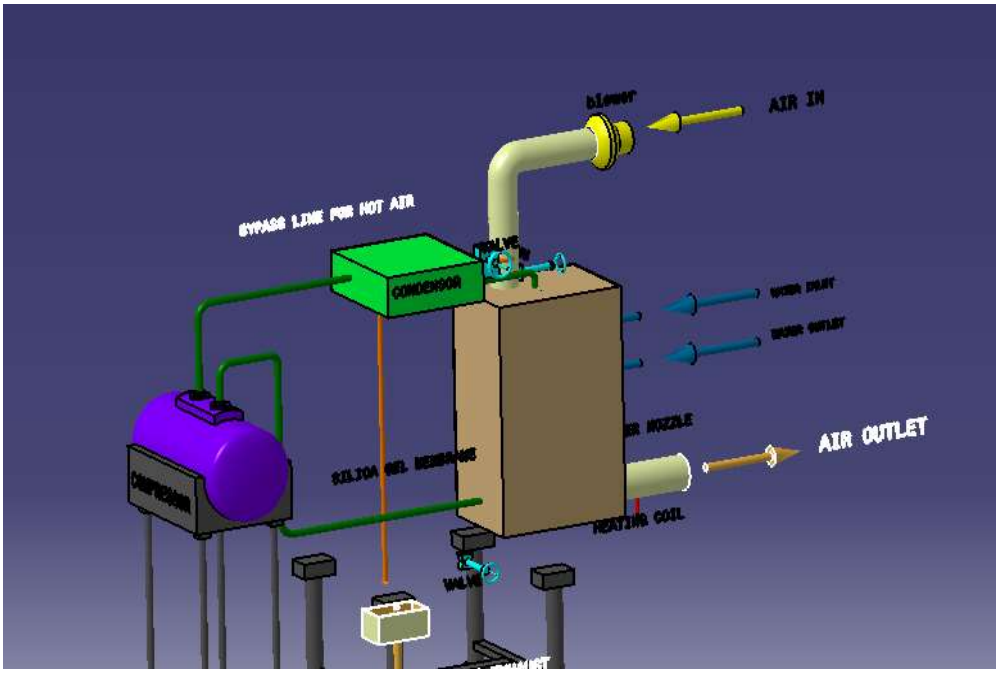


Fig.4: 3D View of System

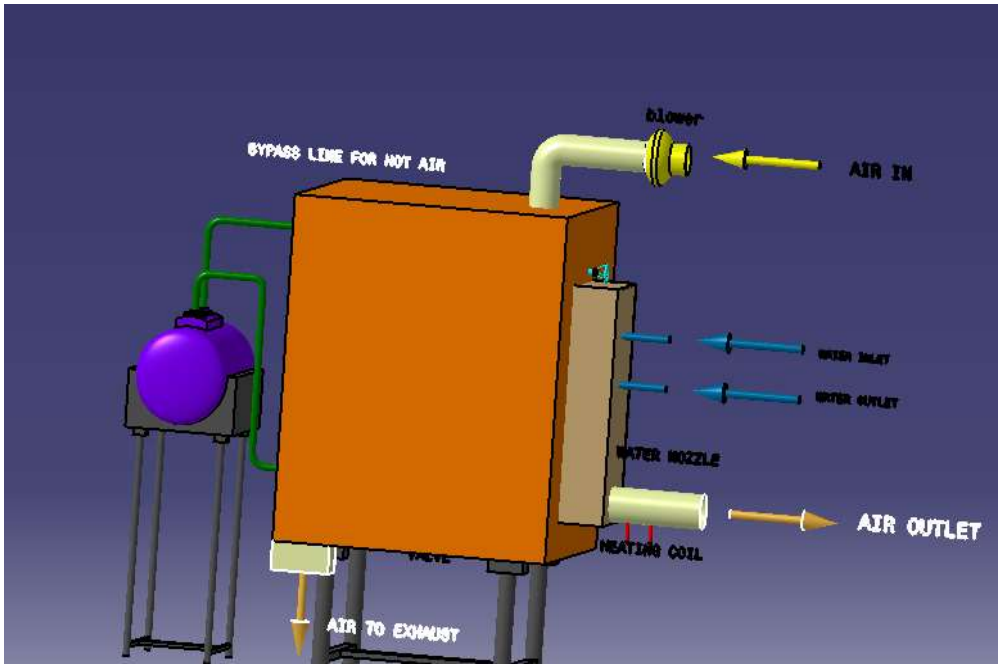


Fig.5: Basic Model of System.

CONCLUSION:

The pollution is increasing on the earth continuously with the developments happening. The temperature of the environment is increasing with pollution. In summer, the temperature increases to high almost in all areas of India. The temperature increase results in need of the cool air and cold water for human being. These two are the essential things during summer season. The present system for these requirements is two different machines needed to fulfill the demand. Air-conditioners and refrigerators are generally used to fulfill these. We have presented the design of unique machine to provide cool air and cold

water. A single machine will be useful for both applications. The idea is to reduce the space requirement and cost of operation for both applications. This machine is very useful for the industries and household application in India.

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