

Utilizing Heat which is Being Dissipated by Condenser of Refrigerator

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Abstract- As we know refrigerator is a device use to keep items at respective temperature, generally at low temperature to preserve items and it is its main function. We have tried to make this device more versatile and efficient, by adding heat chamber. Heat chamber is an external chamber which is installed over our convectional chiller with the help of insulated pillars. We have installed an aluminium chamber over our chiller with the help of insulated pillars and we have wrapped this chamber via refrigerant flow tubes which are coming directly from compressor. Our study have found that refrigerant is compressed up to temperature 30-40 degree Celsius and this hot refrigerant is then allowed to flow through fins which are set at back side of refrigerator for lowering the temperature of refrigerant which is further expanded and allowed to flow through evaporator (chiller). In this process, this HEAT ENERGY is wasted because of dissipation in atmosphere our experiment involve utilization of this heat in most useful channel.

What we are doing is we are allowing this hot refrigerant to flow through this chamber which is wrapped by the flow tubes by allowing hot refrigerant to flow through this chamber give its heat energy to this chamber making that chamber warm say up to temp 30 degree Celsius. And now this chamber will serve as hot chamber to keep our items warm as per our requirement.

Essentially, the main aim of this review paper is to throw light on the research which can be done on the above explained concept.

I. INTRODUCTION

Refrigerator as all of us are familiar with this device, the refrigerator is a device used for preserving several products, food preservation, used for cooling water and also used by many industries for preserving many materials etc. Hybrid refrigerator is a refrigerator which utilises maximum amount of energy as compare to earlier refrigerator. The main aim of making this kind of refrigerator is to utilising maximum amount of energy. In this refrigerator we utilise heat energy which is being wasted during the time cooling of refrigerant at the condenser section.

This is a conceptualized idea of utilization of the heat of the refrigerator that is transfer in atmosphere and gone waste during cooling of a refrigerant.

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II. WHAT IS NEW IN HYBRID REFRIGERATOR

In earlier refrigerator, the high pressure vapour refrigerant gets converted into the low pressure vapour refrigerant when it flows through the condensing coil. This condensing coil are in contact with the air and when the refrigerant flow through these coils by the convection process it become cool and converts into liquid refrigerant. During this process the heat is lost in the surrounding. So, in hybrid refrigerator we utilises this energy by introducing the new aluminium cabin and wrap the condensing coil on this cabin just like the evaporator section so that the heat remains entrap in the cabin and is utilise for keeping items at higher temperature.

III. PROBLEM OCCUR DURING EXPERIMENT AND ITS SOLUTION

When we were performing this experiment we saw that the work done by the compressor of hybrid refrigerator is increased because we wrapped the condensing coil completely in the new cabin and due to this the work done by the compressor is increased and also the cost and weight of the refrigerator is increased because now we have replace this compressor with larger compressor. But our aim is to make energy efficient refrigerator without increasing it cost and weight also. So after doing many experiment we come to a conclusion that by keeping half of condensing coil wrap on the new cabin and half open as in earlier done in refrigerator the work done by the compressor is not increased and our hybrid refrigerator works good.

IV. COMPONENT IN HYBRID REFRIGERATOR

- 1) EVAPORATOR(COOLING SECTION)
- 2) HEATING CABIN.
- 3) EXPANSION VALVE.
- 4) COMPRESSOR.

FIG. 1 shows the newly introduced heating cabin in the refrigerator

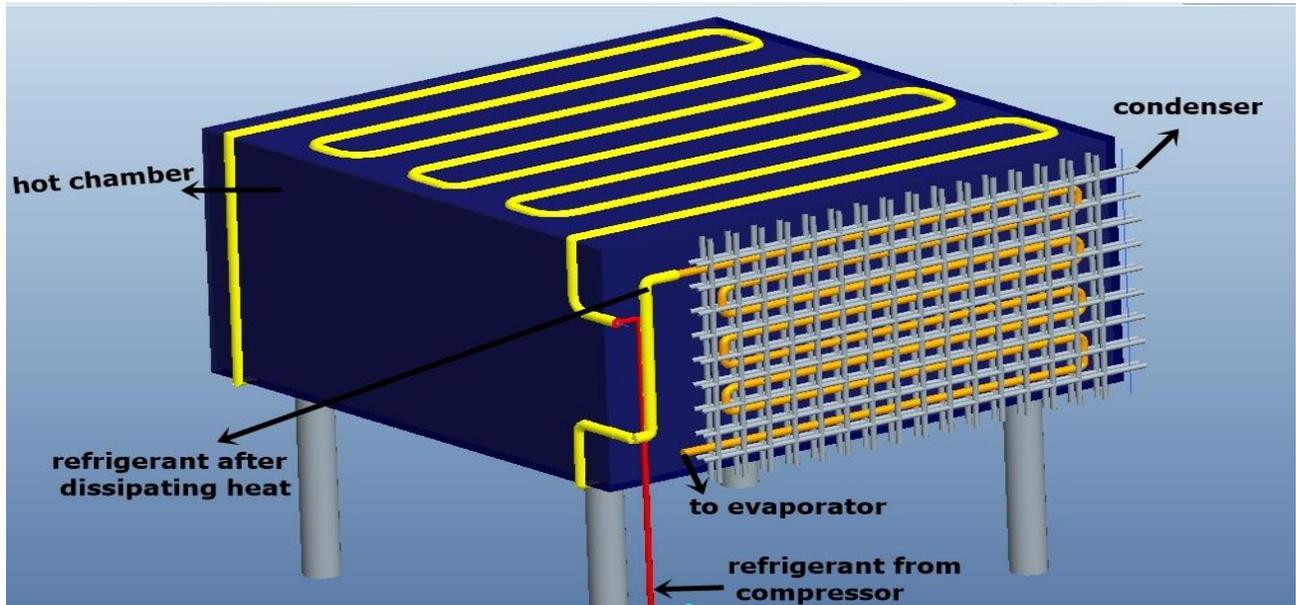
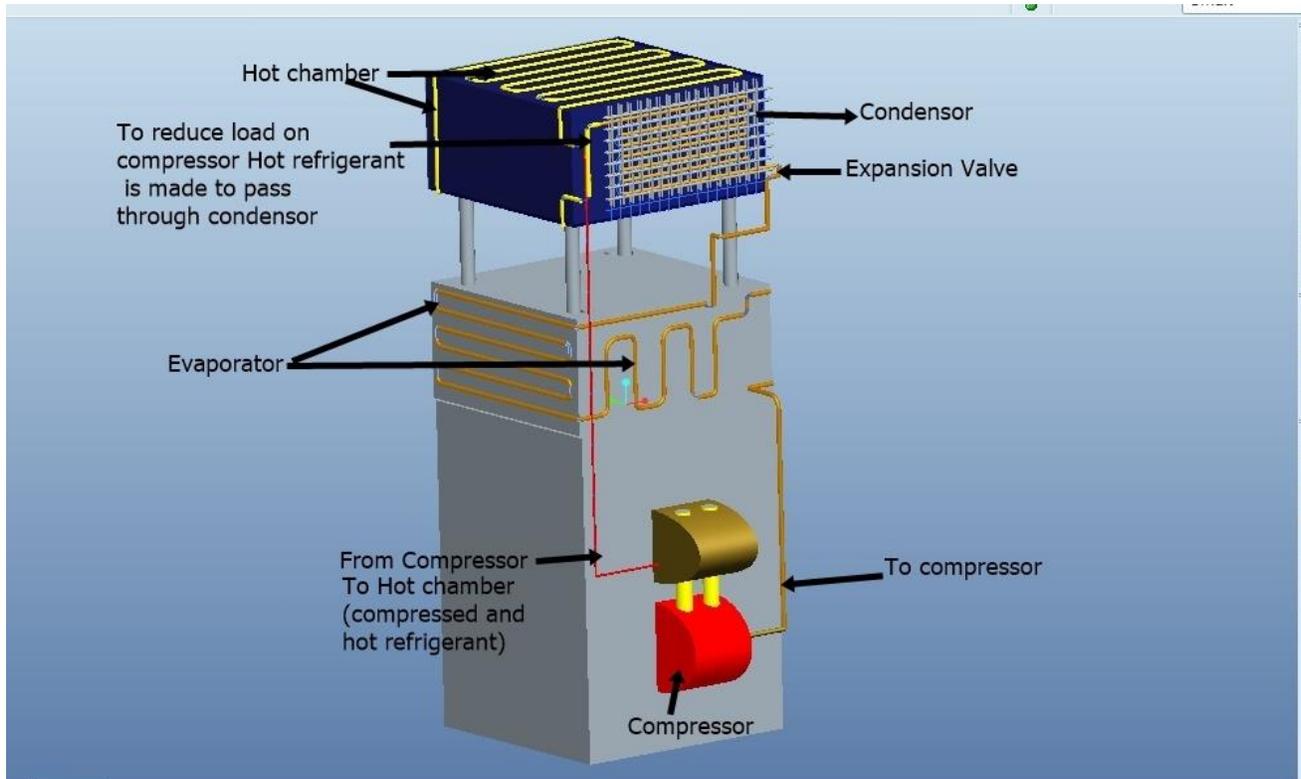


FIG.2 shows the complete assembly of our conceptualized refrigerator



V. WORKING OF HYBRID REFRIGERATOR

- **EVAPORATOR:-** The low pressure and low temperature liquid refrigerant enter the evaporator section where it absorb the heat from the substance kept in the evaporator and make the substance cool and refrigerant converted into low pressure and high temperature vapour refrigerant . Hence this process is constant pressure process.
- **COMPRESSOR:** - Then this low pressure vapour refrigerant enter the compressor. The compressor compressed this low vapour refrigerant into high pressure vapour refrigerant at this section the temperature is also further increases due to the compression of refrigerant. Now at the end of compression the refrigerant is high pressure high temperature vapour refrigerant.
- **CONDENSOR UNIT:-** Now in hybrid refrigerator this can be done in two stages which are as
 - Follows:
 - **NEW CABIN:** First of all this high pressure high temperature vapour refrigerant enter this newly introduce cabin where it flows into the coil which is wrapped around this cabin while flowing through this cabin it makes this cabin warm and the cool substance which is placed in this cabin absorbs this heat and become warm .
 - **OPEN COIL SECTION:** Now after going through this new cabin, this refrigerant is now

allow to flow through the open coils section where it come in contact with the air for further cooling and high temperature vapour refrigerant converts into low temperature vapour refrigerant.

- **EXPANSION VALVE:** Now this low temperature vapour refrigerant enter into expansion valve where it expand adiabatically, basically the capillary tube uses for expansion as it reduces the cost of refrigerator. In this drop of pressure, is done from high to low as at low pressure refrigerant can better absorb energy.

VI. APPLICATION

This type of refrigerator are very useful due to their versatile characteristics as they can be used both for heating and cooling purposes as well as they completely utilize the waste heat which is being rejected at time of cooling of refrigerant.

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