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DESIGN, SIMULATION AND FABRICATION OF SMARTPORTABLE AIR CONDITIONER

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Abstract: Heat as always been a problem in every country such as India. Doing work in a hot summer day can be tiring and are prone to make silly and unwanted mistakes. A smart portable air conditioner would be good item to have during these times. When doing work or event, the place could become stuffy and uncomfortable for technician or engineer therefore smart portable air conditioner can bea big relief to them as it can be carried from one place to another easily.

However normal air conditioners are mostly marketed as fix and hard to change places whereas smart portable air conditioners are easily carriable from one place to another and is less costly as compared to normal air conditioners as well as the components of smart portable air conditioners are easily repairable unlike normal air conditioners in which the components to be repaired can prove to be very costly as well as time consuming. My aim is to make a Smart portable air conditioner that with the help of motion sensor would not only help toreduce electricity wastage but also that is affordable and reliably cool small confined for a limited amount of time and space. As well as it iseco-friendly as it does not release chlorofluorocarbons which normal air conditioners do which harms the atmosphere as it leads to ozone depletion.

Keywords: Design, simulation and fabrication, temperature variation.

1.1 OBJECTIVES

1) To develop a new type of portable air conditioning system which is easy to setup and bring everywhere rather than conventional air conditioner.

2) To develop a new design of smart portable air conditioner that can reduce space and can be used as a decoration.

3) To repair a broken air conditioner to be working and produce a new type of air conditioner.

1.2. SCOPES

After a discussion about this project, we have setup a few limitations that must be attention for this project. The air conditioner should place near and direct to people in order to get full function of the air conditioner. And user needs provide power supply to plug in electricity to smart portable air conditioner.

1.3 FEATURES

1) **Heat mode**: - Even when winter rolls in you can keep single rooms comfortable by choosing a portable ac with built-in heat.

2) **Dehumidification**: - Models with built-in dehumidification models are great options, especially on muggy or rainy days. This setting helps to remove excess moisture from your indoor, leaving you feel more comfortable.

3) **Fan-only operation: -** Ideal for days that don't require cooling or heating, but when you still want fresh air moving throughout your room, this setting runs the fan by itself to keep air flowing.

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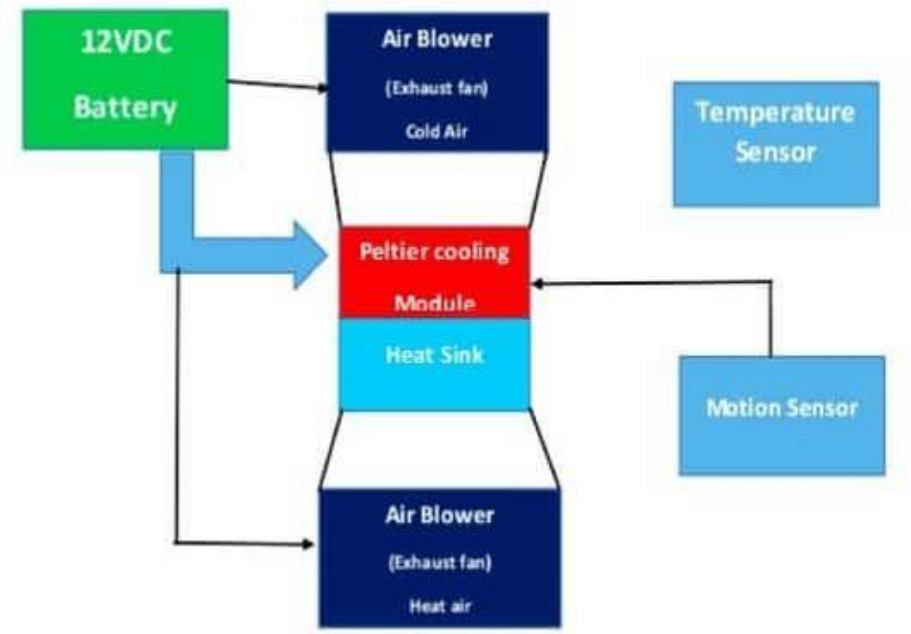
BLOCK DIAGRAM



In this computerized design of smart portable air conditioner components or parts are placed in the same manner as in the actual project. The components included in it are: -

1) 12VDC Battery
2) Air Blower (Exhaust Fan)
3) Peltier Cooling Module
4) Temperature Sensor
5) Motion Sensor

FINAL DESIGN

FRONT VIEW

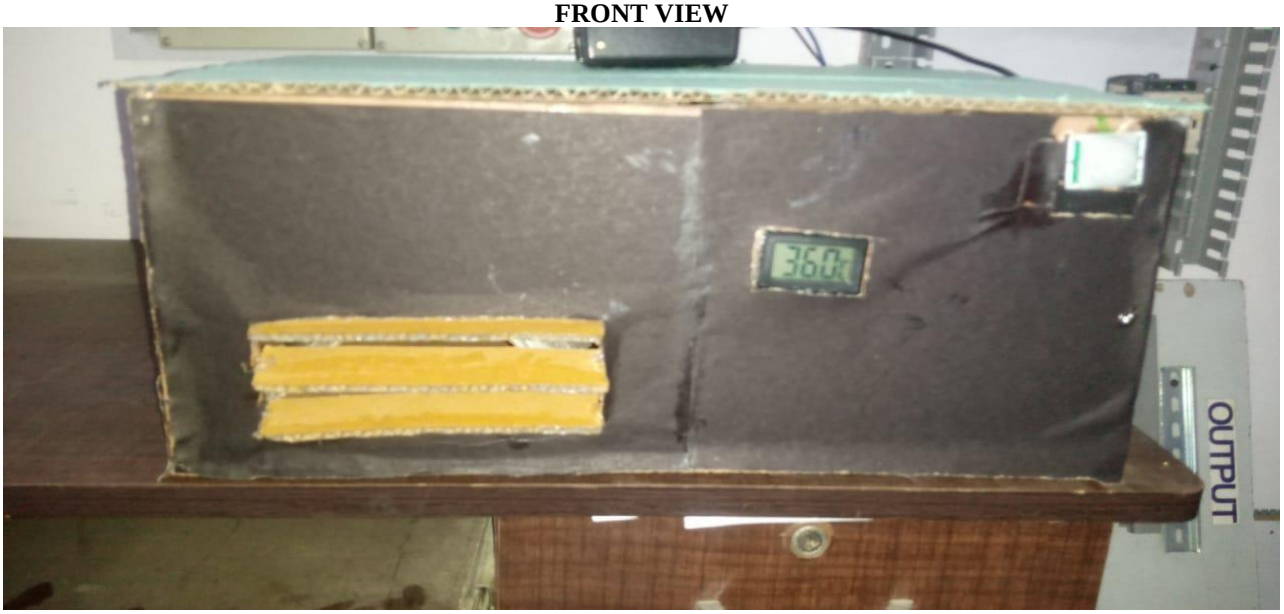


Fig. 1

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TOP VIEW

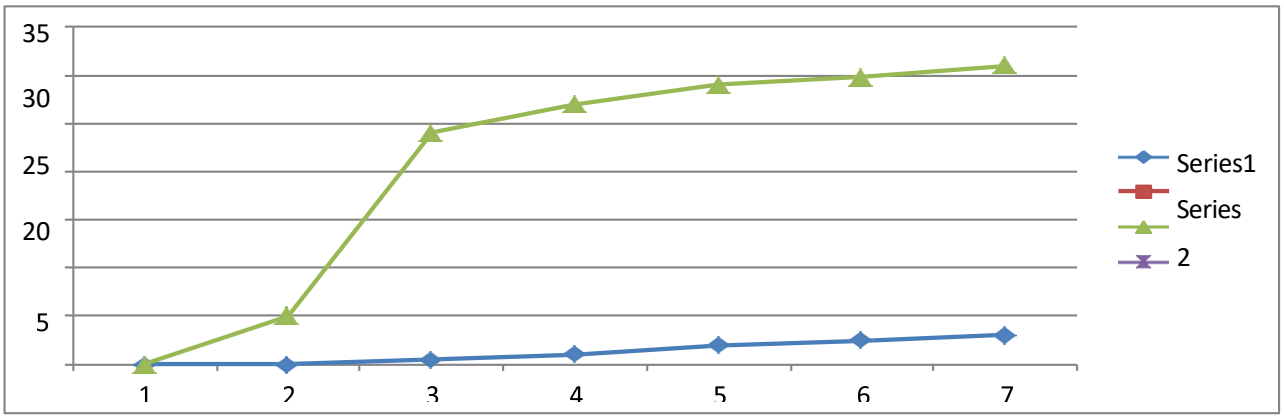
Fig. 2

SIDE VIEW

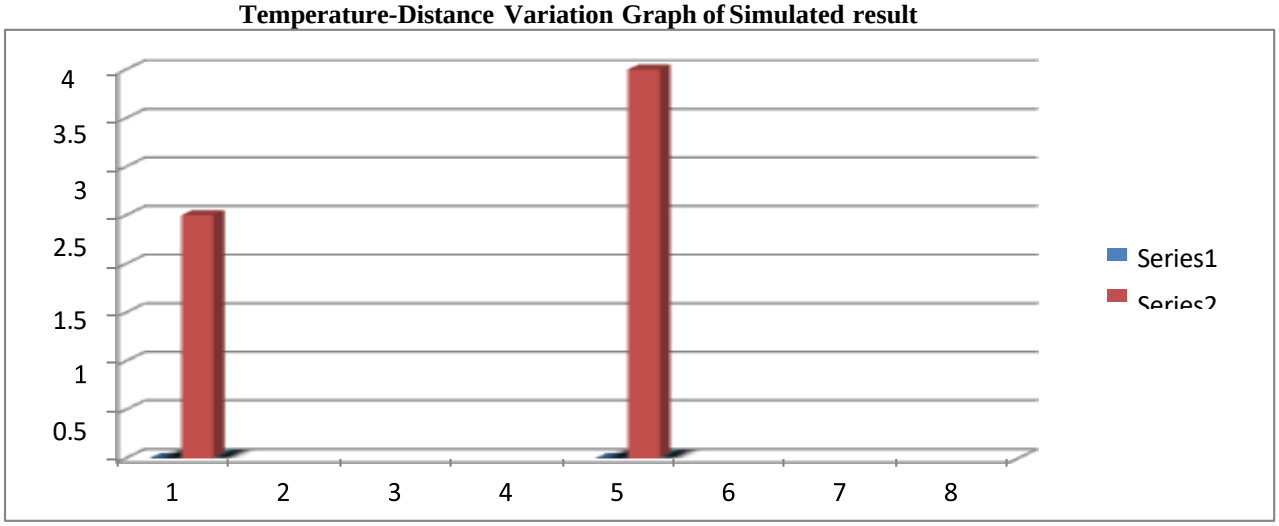
Fig. 3

In this Final Design of our project smart portable air conditioner there is PIR motion sensor along with it there is temperature sensor module to regulate temperature and vent space is present for the flow of cold air and there is exhaust fan for cooling process.

Graphs Of Simulated Result



Temperature-Distance Variation Graph of Simulated result



Coefficient of Performance Graph

In which COP of normal air conditioner = 2.5

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COP of Smart Portable Air Conditioner = 4

RESULT ANALYSIS AND DISCUSSION

Normal air conditioner	Smart portable air Power conditioner
Output (Wattage)/Power Input (Wattage)	Power Output/ Power Input
Power Output = 500 W	Power Output = 800W
Power Input = 200W	Power Input = 200 W
COP of normal air conditioner = 500/200=2.5	COP = 800/200=4

In this result analysis part, I have compared the COP of normal air conditioner with respect to COP of smart portable air conditioner hence I have calculated that COP of smart portable air conditioner is much better than the COP of normal air conditioner.

Comparison between calculation taken from internet andsimulated result

Distance in (feet)	Temp in (°C)	Distance in (feet)	Temp in (°C)
0	**25**	**0**	**5**
0.5	**25**	**0.5**	**24**
1.0	**25**	**1.0**	**27**
1.5	**27**	**1.5**	**28**
2.0	**28**	**2.0**	**29**
2.5	**29**	**2.5**	**29.8**
3.0	**30**	**3.0**	**31**

Calculation taken from Internet Simulated Result

I. CONCLUSION

the purpose of this project is to give a design of portable air conditioner which is to be light in weight so that it can be easily carriable and it should be eco-friendly as it does not release chlorofluorocarbons as compared to normal air - conditioners. my purpose of making this project was also that it should be cheaper as compared to normal air conditioner and its efficiency should be high in comparison to normal air conditioner and it should be easily affordable by poor people also.

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