

Research Article

Energy-saving Conceptual Design for Operating Dual Ceiling Fans with Single Motor

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A B S T R A C T

The authors in this study propose a design arrangement of a dual room fans working with single electric motor which will reduce the electricity consumption. The household electricity consumption is quite high in summer seasons in India and our resources are additionally stressed in order to meet the required demand thus increasing the budget. The fan arrangement works on the principle of bevel gears and increases air flow capacity in the room as the air flow is channeled through two fans instead of a single fan through a single motor. Thus the wide range of air flow also increases the conditions of human comfort.

Keywords: Dual Side Fan, Bevel Gears, Human Comfort, Air Flow

Introduction

There is a lot of emphasis on sustainable energy sources in the current scenario. The current study has put focus on designing a dual fan operating on a single motor² This increases the convection rate in the room which helps in bettering the human comfort conditions.⁴

Clarke P. (2016).³ had proposed a design for 2 fans in a single frame but with 2 motors. The authors here in this research have made a novel design for 2 fans in a single frame with 1 motor only. This design has a sustainable approach.

In this study we have designed a single motor dual fan as it reduces electricity and hence can be used economically at a reliable cost. This type of fan can be used where the area to be covered under the fan is large so that air reaches every corner of the room. This type of fan can be used in dining halls, or at public places like motels, reception halls, etc. The motor is mounted on a shaft connected to two bevel gears which are further used to mount the 2 fans. This increase the reach of each fan, making the air flow better and increasing the human comfort conditions.⁶

Methodology

The motor for the dual fan operates on electrical energy. The electrical energy is converted to mechanical energy using bevel gears and then back to electrical energy for the fans to rotate. The dual side fan rotated by single power source to save the electricity and reliable cost. The bevel gears are used for transferring power from main motor to shaft in equal and more efficient way as compared to the other gears. The motor converts electrical energy into mechanical energy.

Component Details

Bevel Gear: Bevel gears are useful when the direction of a shaft's rotation needs to be changed. They are usually mounted on shafts that are 90 degrees apart, but can be designed to work at other angles as well. The teeth on bevel gears can be straight, spiral or hypoid. Straight bevel gear teeth actually have the same problem as straight spur gear teeth as each tooth engages, it impacts the corresponding tooth all at once.

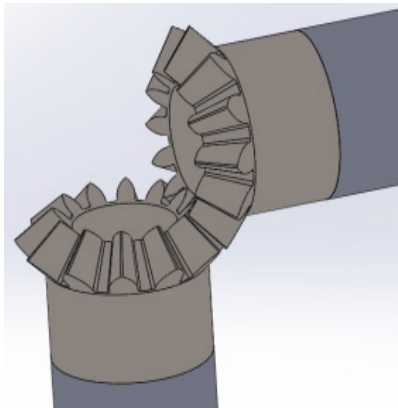


Figure 1. Bevel gears

Mild Steel (MS) Rod: MS rods are commonly used to transmit the power from straight line. In this study we used the rods to transmit the power. The MS rod will be connected to the bevel gears and the motor.

Diagram:

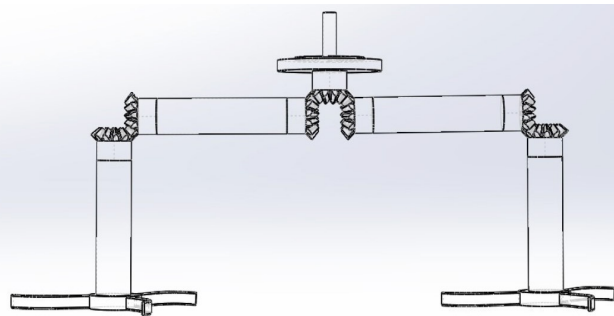


Figure 2. Front view

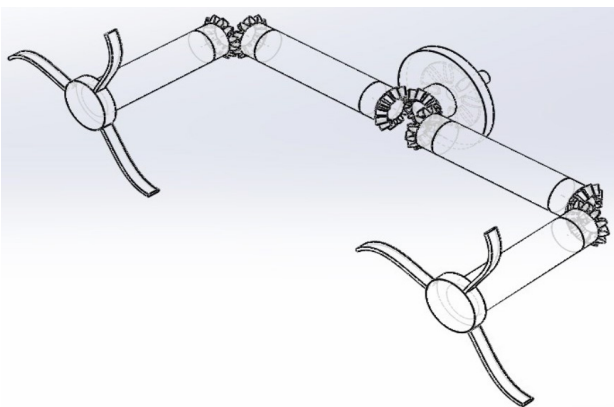


Figure 3. Front left view

Conclusion

In the above study we have designed and simulated a dual fan operating on a single motor. The simulation of such an innovation was a success. This would also help in reducing the risk of sick building syndrome better airflow quality management.¹ We recommend that this fan can be further researched on and modified to even improve the air flow and can be manufactured for regular commercial and

domestic use. This fan can decrease electricity consumption at the same time increasing air flow improving the human efficiency.

This conceptual model can be made a reality which can improve the air flow quality

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