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Design and Fabricationof Ceiling Fan Blades Cleaner

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Abstract
This project presents finite elements-based durability assessment for a new ceiling fan blade cleaner. The objectives of this project are to create a portable, versatile and ergonomic ceiling fan blade cleaner and to create equipment that easy to operate. Sponge and plastic material were studied in this thesis which commonly used in industry. The structural three- dimensional solid modelling of ceiling fan cleaner was developed using the solid work software. The acquired result present both of ceiling fan blades surface is cleaned when used sponge. The dust and cobwebs from blade is free to fall into the dust-box. The durability assessment results are significant to improve the component design at the early developing stage. The results can also significantly reduce the cost and time to market, and improve product reliability and customer confidence.

Keywords: ceiling fan, blades cleaner, design, fabrication

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I. INTRODUCTION

A ceiling fan, one of the most common appliances needs to be cleaned and this project is all about automating the cleaning system in a simpler and economical manner. This idea is something new and we are trying this to be exclusively useful in industries, schools, colleges, hospitals, etc. where the number of ceiling fan count is quite large. Moreover, as the project proves to be a cost effective one, it can be used in households as well. There is no current system that is being tried for the automation for cleaning ceiling fan. The current system involves the hand operated stick with a brush to clean off the dust spread over the fan. So, we tried to eliminate this simpler human effort in an effective manner. In schools or hospitals, where the number of fan population is large it is quite difficult to clean the fan by human regularly, and people also leave it in ease without considering that the dust is interpreting that it may not harm them. Of course, it does harm them, especially in government hospitals where patients are the victims. Also, by automating the system, the laziness of human could be overcome and the cleaning of the fan is done regularly. At the outsight, the idea may seem to be a simpler one but this project involves various mechanisms and motor. The chain drive arrangements at the base and frame with cleaning brush are the various primary components used in the system.

1.1.1 Working Principle

The motor actuates to run the spur gear rotate by opposite direction by newton 3rd law of motion and spur gear connected with chain drive to the cleaning brush with adjusted jaws makes the cleaning operation. The operation of the entire model can be achieved by operation of three different sections namely the base motor section, sensing section and cleaning section. The base motor section aims to lift the scissor ladder to reach the height of fan. This could be achieved by converting motor's rotary motion into reciprocator motion using a lead screw arrangement and hence it is operationally feasible. Also, the DC supply to the motor is fed using a stepdown transformer and a rectifier circuit. In the sensing section, the proximity sensor enables the sensing of the fan blade, and simultaneously the electromagnet holds the cup (center part) of the fan. The cleaning section is actuated by DC motor and lead screw arrangement placed over the wooden base. The microcontroller controls the process of cleaning in a sequence.

1.1.2 Major Components

The metal frame is generally made of mild steel bars for machining, suitable for lightly stressed components including studs, bolts, gears and shafts. It can be case-hardened to improve wear resistance. They are available in bright rounds, squares and flats, and hot rolled rounds Suitable machining allowances should therefore be added when ordering. It does not contain any additions for enhancing mechanical or machining properties. Bright drawn mild steel is an improved quality material, free of scale, and has been cold worked

(drawn or rolled) to size. It is produced to close dimensional tolerances. Straightness and flatness are better than black steel. It is more suitable for repetition precision machining.

Figure1: Metal frame

1.1.3 Battery

Figure2: Battery

In isolated systems away from the grid, batteries are used for storage of excess solar energy converted into electrical energy. The only exceptions are isolated sunshine load such as irrigation pumps or drinking water supplies for storage. In fact, for small units with output less than one kilowatt. Batteries seem to be the only technically and economically available storage means. Since both the photo-voltaic system and batteries are high in capital costs. It is necessary that the overall system be optimized with respect to available energy and local demand pattern. We use lead acid battery for storing the electrical energy from the solar panel for lighting the street and so about the lead acid cells are explained below.

1.2 Principles of Operation

The basic principle of Motor action lies in a sample sketch. The motor run's according to the principle of Fleming's left hand rule. When a current carrying conductor is placed in a magnetic field is produced to move the conductor away from the magnetic field. The conductor carrying current to North and South poles is being removed.

In the above stated two conditions there is no movement of the conductors. Whenever a current carrying conductor is placed in a magnetic field. The field due to the current in the conductor but opposes the main field below the conductor. As a result, the flux density below the conductor. It is found that a force acts on the conductor to push the conductor downwards. If the current in the conductor is reversed, the strengthening of the flux lines occurs below the conductor, and the conductor will be pushed upwards

As stated above the coil side A will be forced to move downwards, whereas the coil side B will be forced to move upwards. The forces acting on the coil sides A and B will be the same coil magnitudes, but their directions will be opposite to one another. In DC machines coils are wound on the armature core, which is supported by the bearings, enhances rotation of the armature. The commentator periodically reverses the direction of current flow through the armature. Thus, the armature rotates continuously.

An electric motor is all about magnets and magnetism: a motor uses magnets to create motion. If you have ever played with magnets you know about the fundamental law of all magnets: Opposites attract and likes repel.

So, if you have 2 bar magnets with their ends marked north and south, then the North end of one magnet will attract the South end of the other. On the other hand, the North end of one magnet will repel the North end of the other (and similarly south will repel south). Inside an electric motor these attracting and repelling forces create rotational motion.

In the diagram above and below you can see two magnets in the motor, the armature (or rotor) is an electromagnet, while the field magnet is a permanent magnet (the field magnet could be an electromagnet as well, but in smallest motors it is not to save power).

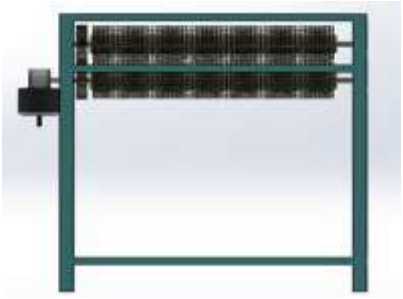

Figure 2: Front view

Figure 3: Isometric view

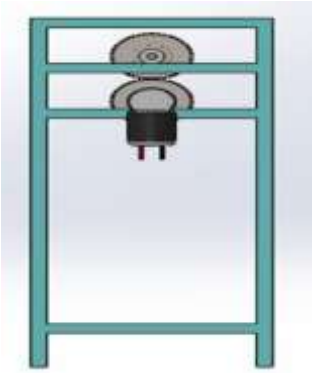

Figure 4: Side view

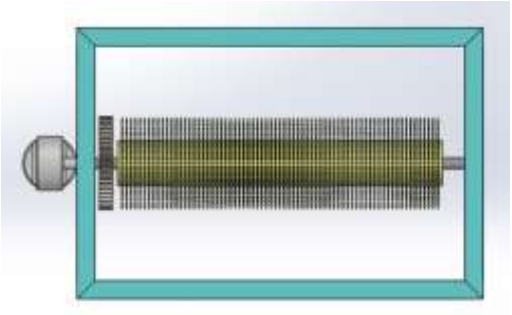

Figure 4: Top view

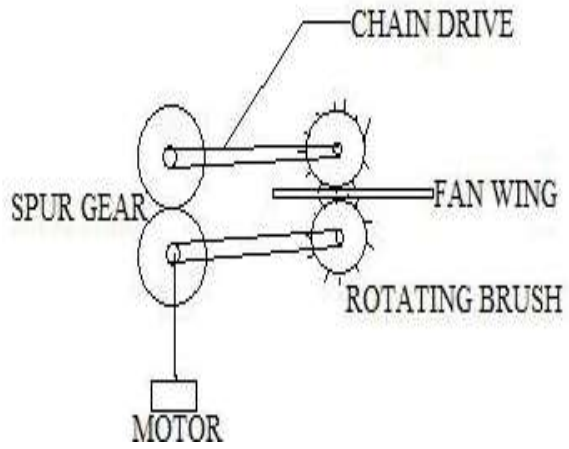

Figure 5: 2D Layout of model

1.2.2 Material Used

Table 1 represents the material usedspecification.

Table 1: Material used Specification.

S. NO	DESCRIPTION	QTY	MATERIAL
1	Dc motor	1	Electric
2	Spur gear	2	Metal
3	Chain drive	2	Metal
4	Cleaning brush	2	Fiber

II. CONCLUSION

In this manner another framework for cleaning of the roof fan is produced. The total mechanization of the framework is accomplished and the framework turns out to be practical also. Likewise, the goal of our framework, convey ability is happy with the plan that has been created. This ensures the regular cleaning of the fan in various localities such as hospitals, schools, and industries etc. Also, the regular cleaning of fan can be ensured using the automated system. Thus, the hygienic environment is promoted and the health of the person who needs to clean the fan will not feel sluggish. The dust sufferers are the main benefits of this system and in case of houses with small children and babies, this system proves to have a great advantage.

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