



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**TO STUDY THE CONCEPT OF PERPETUAL MOTION ON  
CEILING FAN BY USING PERMANENT MAGNET**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Mechanical Engineering Technology (Automotive Technology) with Honours

by

**ADI AZRI BIN NGAHDIMAN**

**B071410743**

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**TIDAK TERHAD**

Di sahkan oleh:

Alamat Tetap:

Lrg. Haji Hashim, Kg. parit Tegong,  
Rimba Terjun, 82000 Pontian ,  
Johor Darul Takzim

Cop Rasmi:

Tarikh:

Tarikh: \_\_\_\_\_

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Date :

## **APPROVAL**

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Mechanical Engineering Technology (Automotive) with Honours. The member of the supervisory is as follow:

**EN MUHAMMED NOOR BIN HASHIM**

.....

(Project Supervisor)

## ABSTRAK

Kipas siling merupakan sejenis kipas yang digantungkan pada siling rumah untuk mengitar udara melalui bilah-bilah kipas berputar. Kipas angin berfungsi dengan menyebarkan udara di sekeliling bilik dengan lebih menyeluruh. Ia tidak mengubah suhu bilik secara langsung. Lazimnya, kipas siling berputar pada arah lawan jam untuk menolak udara sejuk turun ke bawah. Apabila menghampiri lantai, angin yang dihasilkan akan terserak ke semua arah, dan udara panas akan naik ke atas secara semulajadi untuk menggantikan sejuk udara yang telah ditolak ke bawah. Peredaran udara yang dihasilkan ini mempercepatkan proses penyejukan manusia secara semulajadi melalui penyejukan peluh. Berikutan itu, perbuatan membiarkan kipas siling terus hidup tanpa ada orang di dalam bilik boleh dianggap sebagai pembaziran tenaga elektrik. Tenaga elektrik yang digunakan adalah secara terus dan tidak boleh dikitar semula. Masalah ini menyebabkan penggunaan tenaga elektrik yang banyak disamping kos bil elektrik yang mahal. Kipas siling tenaga percuma membantu pengguna menyejukkan suhu sekitar tanpa menggunakan tenaga elektrik. Oleh itu, projek ini membincangkan reka bentuk dan fabrikasi kipas siling prototaip menggunakan magnet kekal. Konsep ini akan berdasarkan pergerakan abadi. Gerakan abadi adalah gerakan badan yang berterusan selamanya. Semasa pembangunan kipas siling menggunakan magnet kekal, teknik reka bentuk total digunakan. Tiga reka bentuk konseptual dihasilkan untuk pemilihan. Kemudian reka bentuk yang dipilih melalui proses penggambaran menggunakan CATIA Software dan proses fabrikasi untuk menghasilkan prototaip kipas siling menggunakan magnet kekal.

## ABSTRACT

A ceiling fan is a mechanical fan, usually electrically powered, suspended from the ceiling of a room that uses hub-mounted rotating paddles to circulate air. The fan works by spreading the air around the room more thoroughly. It does not change the room temperature directly. Typically, the ceiling fan rotates clockwise to push cold air down. When approaching the floor, the wind will scatter in all directions, and the hot air will rise naturally to replace the cold air that has been pushed down. The resulting circulation of air accelerates the process of cooling the human body naturally through sweating evaporation. Consequently, the act of letting the ceiling fan survive without anyone in the room can be considered a waste of electricity. Ceiling fan have indeed been in use as long as there has been electricity. The energy used is directly and cannot be recycled. This problem causes a lot of electrical energy consumption and costly. The free energy ceiling fan help user to cool down surrounding temperature without using electric energy. Thus, this project discusses on designing and fabricating a prototype of ceiling fan using permanent magnet. The concept will be based on perpetual motion. Perpetual motion is a motion of bodies that continues indefinitely. During the development of ceiling fan using permanent magnet, total design technique was used. Three conceptual designs were generated for selection. Then the selected design go through a drawing process using CATIA Software and the fabricating process to produce a prototype of ceiling fan using permanent magnet.

## **DEDICATION**

Special dedication to my beloved family members, especially to my father, Ngahdiman bin Hashim, my mother Zuridah binti Bachok, my sibling Adi Azizi, Ida Nadia, Ida Naziera, Ida Nadiera and Ida Nazura who always supported and encouraged me with motivation and love through my whole journey.

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## **LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE**

2D - Two-Dimensional

3D - Three-Dimensional

AC - Alternating Current

Br - Remnant Flux Density / Remanance

BH max - Energy Product

DC - Direct Current

CAD - Computer Aided Design

CATIA - Computer Aided Three-Dimensional Interactive Application

CFM - Cubic Feet Per Minute

Hci - Coercivity

NdFeB - Neodymium Iron Boron

RPM - Rotational Per Minute

SmCo - Samarium Cobalt

Tc - Curie Temperature

# CHAPTER 1

## INTRODUCTION

### 1.0 Introduction

These projects are focused on study a perpetual motion ceiling fan by using permanent magnets. The concept will be based on perpetual motion that is body motion that carries on indefinitely. In this project, we must understand the overview concept of perpetual motion to design the mechanism and the prototype.

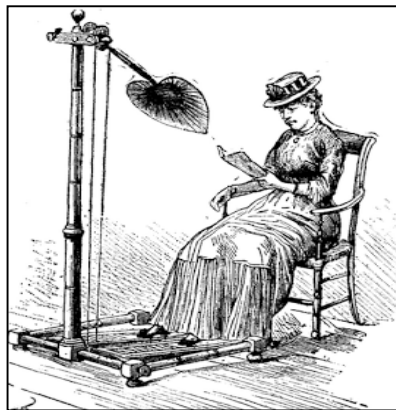
The movement of a theoretical machine that once actuated, would run until the end of time unless subject to an external force or to wear. Magnets that have the same polarity will produce a repulsive force that utilized to move or rotate the blade ceiling fan.

This project will use current design of a ceiling fan as the referral design and make comparisons of speed, airflow and rotation per minute (RPM). Comparisons were moreover performed on the connected magnetic and magnetic strengths appropriate for cubic feet per minute (CFM) required. The material that be used also act in the performance since it has its own characteristic value ought to be taken into consideration in creating this project.

## 1.1 Research background

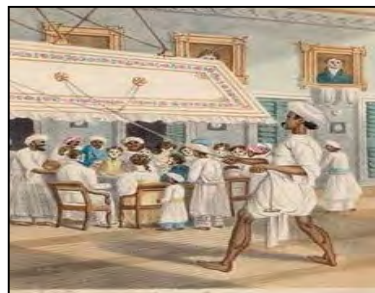
### 1.1.1 Ceiling fan

The advancement of ceiling fan was an essential huge occasion in the realm of electrical machines. This apparatus is one that has been disregarded by practically everybody with regards to advancement. In any case, regardless they are a straightforward and reasonable wellspring of break from hot atmospheres in tropical nations.



**Figure 1-1:** A fan that made from palm frond.

In the mid 17th century in India, a comparable sort of fan was the 'punkah', a palm frond swung from the ceiling that moved when a servant pulled a rope.



**Figure 1-2 :** A 'Punkah' fan

The following arrange was the approach of ceiling fans controlled by steam and a turbine. Such systems were belt driven and can serve entire fan system. These fans were



most usually in the southern and south western states like Texas, Louisiana , Mexico, and Arizona, and this was indeed before the common utilize of power.



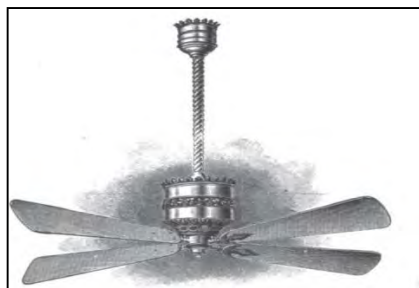
**Figure 1-3 :**Belt driven ceiling fan

In 1882, German-American man named Philip Diehl made electrically powered ceiling. An electric motor that he had intended for use in the Singer sewing machines was introducing it into what might be the world's first ceiling fan.



**Figure 1-4 :** Phillip Diehl

Then, Phillip Diehl ceiling fan has presented the first electric ceiling fan in 1887. He has patented his ceiling fan in 1889. Shortly a while later in 1896 in Fulton, New York, the modern ceiling fan time started with the production of the alternating current. Phillip Diehl kept on influencing enhancements to his development in the wake of confronting wild rivalry because of the business achievement of the ceiling fan. He made a light kit fitted to the ceiling fan to combine the two functions in a single unit.



**Figure 1-5:** The first electric ceiling fan of Phillip Diehl

Ceiling fans were becoming common in the United States in 1920. The ceiling fan operated with four blades instead of the original two blades, which allowed them to be quieter and made fans circulate more air.



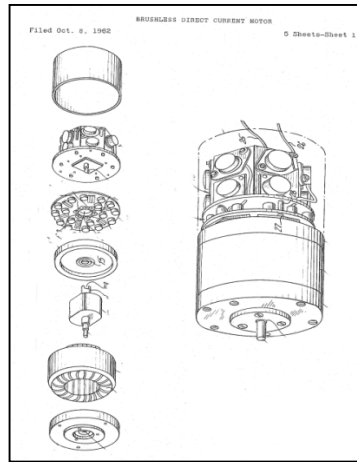
**Figure 1-6 :** 1920 Ceiling fan

Ceiling fans gradually began to phase out from prevalent usage in the United States when the air conditioners were presented in the 1950s. But as that was happening, they started getting to be gigantically prevalent in different tropical nations like India and other African nations.

During the energy crisis late 1970 and early 1980, Crompton-Greaves Ltd. And Encon Industries have made a few changes in acknowledgment motor development and led to the production of ceiling fans which consume a power around 70 Watt to 80 Watt. Numerous American producers have also begun altogether expanding the number of ceiling fans produced due to this re-established commercial victory utilizing ceiling fans successfully to save energy. But the world of ceiling fans did not see much advancement after this period ended with broad utilization in a few countries.

Since 2000, imperative advances have been made by companies advertising higher priced ceiling fans with more enhancing value. Brushless coordinate current

engines or BLDC engines to begin with made in 1962. But it was utilized in ceiling fans by Emerson Electric in the United States in 2009, after nearly 47 years afterward. This new motor innovation introduced in a modern era of energy efficient ceiling fans reduced power utilization indeed encouraging underneath 50W.

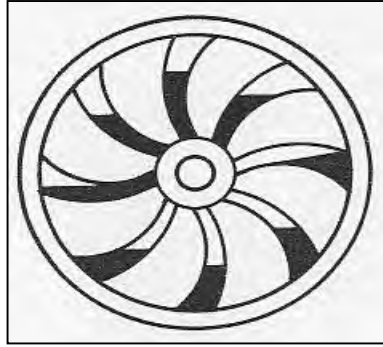


**Figure 1-7 : 1962 Brushless direct current motors**

This innovation was first brought in India by Versa Drives Pvt. Ltd when they launched Super fan and accomplish a power utilization of 35W. Furthermore, Atom berg Technologies, with the Gorilla Fans have taken power, sparing to another level out and out by launching 28W fan. This while accomplishing the same level of execution from any ordinary 70W to 80W fan. Where 22% of the people in India still do not approach electric power, innovation and advancements are required that can empower us to save vitality or take advantage of substitute vital sources.

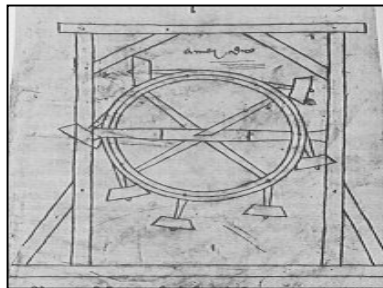
### **1.1.2 Perpetual motion machine.**

Bhaskaracharya (1114 to 1185), the Indian Mathematician and Astronomer portrays a ceaseless movement, instrument as figure 1-8 in one of his scholarly works with the explanation. He said that the mercury is on the one side of the wheel closer the hub and more distant from the other side make this never-ending machine pivots at full speed.



**Figure 1-8 : Bhaskara Wheel**

The 13th century French ace artisan and planner, Villard de Honnecourt has a drawing of a never-ending movement machine in his sketchbook. With his ceaseless machine, Villard's Wheel, Villard de Honnecourt said that many a time have skilful laborers attempting to think up a wheel that should turn of itself. Here is a way to make such a one, by implying of an uneven number of hammers, or by mercury (mercury).



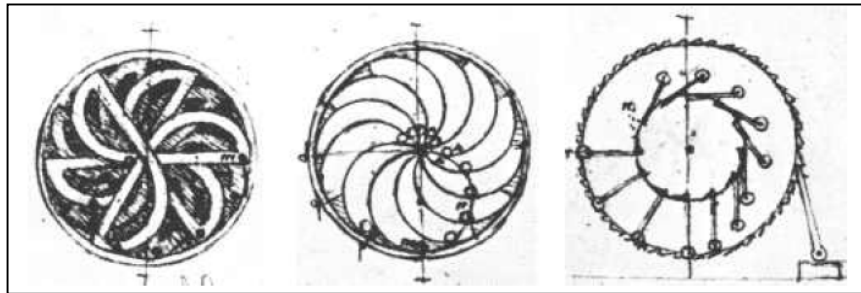
**Figure 1-9 : Villard Wheel**

The first artist-engineers who composed outlined writings of designing plans, utilizing drawings viably as a medium of communication was Mariano de Iacopo, called Taccola (1382 to 1458) from Siena. The thought of a mechanically "overbalanced" wheel really started in the Orient, and is likely the inspiration for Villard's wheel. It is one of the easiest to construct. This demonstrates is from the Deutsches Historical centre. It's made of wood with brass pivots. Hans-Peter Gramatke helping and avoiding the wheel from moving so that it could be photographed in the museum's lower light without blurring.



**Figure 1-10** : Model of Taccola's wheel at Deutches museum.

Leonardo da Vinci was made a number of drawings of devices. He trusted that he would make free energy. In spite of the fact that he was by and large against such devices, but he interested drew and inspected various over adjusted wheels.



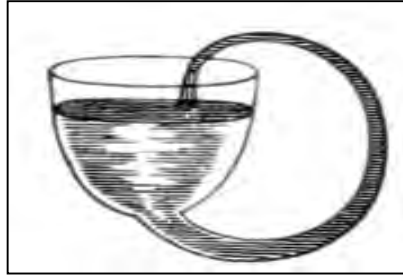
**Figure 1-11** : Leonardo's drawing of perpetual motion

The 16<sup>th</sup> century Italian scholar, Mark Anthony Zimara was proposed a self-blowing windmill.



**Figure 1-12** : Illustration of Zimara's windmill by Burton Lee Potterfield.

Cornelius Drebbel in "Wonder-vondt van de ewighebewegingh" devoted a Ceaseless movement machine to James I of Britain in 1607. In 1621, it was depicted by Heinrich Hiesserle von Chodaw. Robert Boyle fabricates the "never-ending vase" which was talked about by Denis Papin in the Philosophical Exchanges for 1685. Johann Bernoulli proposed a fluid energy machine.



**Figure 1-13 :** Perpetual Goblet.

A self-powered water process and a few never-ending development machines using balls utilizing varieties of Archimedes screws were arranged by George Andreas Bockler in 1686. In 1712, Johann Bessler (Orffyreus) was examining 300 unmistakable perpetual movement models and he claimed that all the illustrate have the secret of never-ending motion

James Cox and John Joseph Merlin created Cox's timepiece in 1760. Cox claimed that the timepiece was a genuine perpetual motion machine, but as the device was powered by changes in barometrical weight through a mercury barometer.

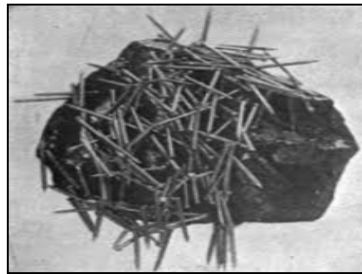


**Figure 1-14 :** Cox's timepiece.

In 1775, the Royal Academy of Sciences in Paris has stated that the Academy will no longer accept or deal with proposals concerning perpetual motion.

### 1.1.3 Magnet

Magnes, the legend of Shepherd who lived in Magnesia near Mount Ida in Greece is the most well known history for the revelation of magnets. Mount Ida was alluded to as the "Mountain of the Goddess". Roughly 2,600 a long time prior (600 BC) Magnes found that the nails and buckle of his shoes and the tip of his staff were attracted to the rock he was standing on while shepherd sheep on the mountain. He burrowed up the soil to discover lodestones. Lodestones contain magnetite, a characteristic attractive fabric  $Fe_3O_4$ .



**Figure 1-15 :**Lodestone

The word magnet is determined from the Greek title, lithos magnetism. The stone of Magnesia alluding to the locale on the Aegean coast in present-day Turkey where these attractive stones were found.

The English man named Alexander Neckam records the earliest European understanding of the early magnet compass as a guide to seamen in approximately 1180. The term of lodestone comes from the Anglo-Saxon that mean "driving stone" or actually "the stone that leads". Eider-stein, the Icelandic word and was used in writings of that period in reference to the route of ships.

In 1600, English researcher named William Gilbert affirmed previous perceptions with respect to magnetic poles and concluded that the earth was a magnet. In 1820, the Dutch researcher Hans Christian Oersted found the relationship between electric power and magnetism, and French physicist Andre Ampere assisted extended upon this revelation in 1821.



In the early 1900s, researchers began examining magnetic materials other than those based on iron and steel. By the 1930s, Alnico alloy is the first effective permanent magnets had created by researchers



**Figure 1-16 :** Assortment of Alnico alloy permanent magnets.

In 1966, the first uncommon soil magnets were created from Samarium-Cobalt ( $\text{SmCo}_5$ ) creating a high energy item of 18 MGOe. In 1972, an advance improvements were made utilizing Samarium-Cobalt ( $\text{Sm}_2\text{Co}_{17}$ ) to create a higher energy magnet item of 30 MGOe.

The high energy item of 35 MGOe from a compound of Neodymium-Iron-Boron ( $\text{Nd}_2\text{Fe}_{14}\text{B}$ ) alluded to as neo magnets or uncommon soil magnets was created by General Motors, Sumitomo Special Metals and the Chinese Foundation of Sciences in 1983. Neo magnets are the most grounded sort of permanent magnet in the world. The colossal intrigued these magnets have created emerges since for the to begin with time, a modern magnetic material has been presented which is not as it was more grounded than the past era but is more efficient.



**Figure 1-17 :** Neodymium-Iron Boron Magnet