UNIVERSITI TEKNOLOGI MARA

DESIGN AND FABRICATION OF PORTABLE MINI AIR COOLER

MUHAMMAD AMIR ZUHAIR BIN ABD RAZAK

DIPLOMA

Feb 2025

ABSTRACT

The need for air coolers has increased in recent years, as global temperatures have become unpredictable. The necessity for an air cooler is critical for persons who live or work in cities, workshops, or offices to have a pleasant location to work or live in hot weather. Unlike standard air conditioners which has the compressor unit to keep the air cool, bulkiness of the inside and outdoor unit and complicated to install, these coolers use evaporative cooling technology, which draws in heated air, passes it through a moistened filter, and then releases a stream of cold, humidified air into the surrounding area. This method not only reduces the ambient temperature but also adds moisture to the air, reducing dryness and increasing comfort, particularly in arid conditions. Thus the main objective of this project is to develop a compact and lightweight 3 in 1 cooling device that is capable to humidified, purify and cooled the air in the area without the complex installation like the standard air conditioner. Furthermore, this mini air cooler can easily portable and suitable for use in various environments. In addition, from that the purpose of this project is to construct a transportable mini air cooler with its own power source and rechargeable battery, allowing the user to bring the product anywhere.

In conclusion, portable mini air coolers are a versatile and efficient alternative for personal cooling, cleaning the air and humidified. Their small size, internal energy, and improved functions make them useful companions for anyone looking for comfort and relief from the heat in a variety of indoor and outdoor locations.

ACKNOWLEDGEMENT

Firstly, I wish to thank God for giving me the opportunity to embark on my diploma and for completing this long and challenging journey successfully. My gratitude and thanks go to my supervisor, Mr. Mohd Ghazali Bin Mohd Hamami for guiding me to finish this final year project. I would also like to thanks all my friend for helping me in many things from transportation when rain, idea for brainstorming idea and come up with brilliant and intelligent solution, helping with the project in many ways possible and many more without them this journey will be far more difficult to be execute from start until the finish. Finally, this dissertation is dedicated to my father and mother for always there for support me when facing a problem and they vision and determination to educate me until now. This piece of victory is dedicated to both of you. Alhamdulillah.

TABLE OF CONTENTS

CHAPTER ONE
INTRODUCTION

1.1 Background of Study

Cooling systems are crucial for sustaining comfort in Malaysia's existing hot and humid climate. Traditional air conditioning systems are effective, but their size, power needs, and installation limits make them problematic for personal use in tiny areas or outdoor situations. Portable tiny air coolers with batteries are a practical and energy efficient option that provide on-the-go cooling solutions for people in a variety of environments.

Existing Solutions:

1. Traditional electric fans generate flow but do not actively cool the air, resulting in minimal comfort in hot weather.
2. Battery-powered fans: While portable fans enable mobility, they may not provide enough cooling in higher temperatures.
3. Personal Evaporative Coolers: Some portable evaporative coolers use water evaporation to reduce air temperature, offering excellent cooling in dry conditions.

Limitations of Existing Solutions:

1. Limited Cooling Capacity: In hot and humid situations, traditional and battery powered fans may not offer enough cooling.
2. Dependence on Electricity: Most portable cooling systems rely on external power sources, making them ineffective in outdoor environments or during power outages.
3. Bulkiness: Some portable cooling systems are heavy or unwieldy, making them less portable and convenient for consumers on the move.

The suggested method seeks to overcome the limits of current portable cooling devices by combining effective cooling technology with the ease of battery operation. By creating a tiny and lightweight portable air cooler driven by a rechargeable battery, customers may enjoy excellent cooling wherever they go without the need for other power sources.