UNIVERSITI TEKNOLOGI MARA

DEVELOPMENT OF A PROTOTYPE MECHANICAL ONE-HANDED GRASS CLIPPING CLEANER

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DIPLOMA

Jul 2023

ABSTRACT

This study examines the role of single-handed mechanical grass clipping cleaner as farmers need an easier way to clean grass clipping after the grass is cut. Using traditional rakes is not effective as it consumes time and energy to clean a larger field. Moreover, when using the blower, it required fuel to power up the blower motor. This method is high cost and not environmentally friendly as the blower will exhaust harmful gases. The objective of this project is to design a single-handed mechanical grass clipping cleaning device that can be operated by a single person by benchmarking and comparing the design with related available products in the market. An analysis is made to the finalised design on the rotating element part to study the maximum stress that can be withstand by it while the mechanical grass clipping cleaner is operating. Moreover, to fabricate single handed mechanical grass clipping cleaner that is only powered by power transmission mechanism. In conclusion, the prototype is fabricated, and it works when the rotating element rotates to collect the grass clipping into the collecting bin. The rotating element is rotated by the power that is transmitted by the sprocket and chain from the back tire. Result shows grass clippings are collected inside the bin effortlessly without producing any sound and harmful emissions.

ACKNOWLEDGEMENT

I would like to express my profound gratitude to all those who have contributed to the successful completion of this dissertation. This journey has been challenging and rewarding, and I could not have achieved it without the support and encouragement of many individuals and institutions.

First and foremost, I extend my heartfelt appreciation to my dissertation advisor, Dr. Azizul Hakim Bin Samsudin, whose unwavering guidance, wisdom, and patience have been invaluable throughout this research. Your expertise and mentorship have been instrumental in shaping the direction and quality of this work.

I am also indebted to my friends and family for their unwavering support, understanding, and encouragement during this academic journey. Your belief in me and your willingness to be a source of motivation have been a source of strength.

Last but not least, I want to thank me, I want to thank me for believing in me, I want to thank me for doing all this hard work. I want to thank me for having no days off. I want to thank me for never quitting. I want to thank me for always being a giver and trying to give more than I receive. I want to thank me for trying to do more right than wrong. I want to thank me for being always me.

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CHAPTER ONE
INTRODUCTION

1.1 Background of Study

In Asian countries especially Malaysia, the usage of lawn mower is very common. A lawn mower is used to cut a grass surface to an even height. The usage of this lawn mower or this grass cutter will leave grass clipping that needs to be cleaned. For farmers, they prefer to clean this grass clipping using a traditional rake. A rake is a type of gardening or landscaping tool with a handle that ends in the head. You can use a rake for scooping, scraping, gathering, or levelling materials, such as soil, mulch, or leaves. As the larger field is cleaned by the lawn mower, the usage of traditional rake has become inconvenient as the grass clipping produce will be large. Grass clippings can be used as mulch and have many pros including reducing moisture loss from soil, stops weed growth and adds organic matter to soil. Mulching with grass clippings can have cons if it is laid too thick including becoming too soggy, anaerobic, or smelling. This can attract bugs and mold can form on top of thick layers.

To avoid this situation, farmers cleaned this grass clipping using rake after mowing the field. However, this will consume a lot of time and energy as the farmers need to sweep all the grass clipping manually using the rake. This is not only resulting in high work intensity but also inconsistent cleaning efficiency. Some of the farmers tend to use the blower to clean the grass clipping but the blower produces a loud noise that will cause sound pollution. Moreover, to power the blower fuel is need resulting this machine is not environmentally friendly.

Hence, there is a need to design and develop a single-handed mechanical grass clipping cleaner. The aim of this project is to design a mechanical grass clipping cleaner as a purpose to relieve any difficulties with traditional rake that we already have in the current market right now. This cleaner can easily be used by the farmers and is cost-friendly. This mechanical device is simple to operate for all ages. The maintenance cost is also low as the device does not need any fuel as the device used mechanical energy produced using the two-sprocket attached at the device tire. This produces power transmission in which a roller chain is engaged with the two sprockets. The advantages of this device can help the user reduce their energy and save time.