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Fabricated of Motorized Vegetable Cutting Machine

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Abstract: *This project focuses on the design and development of an Automated Vegetable Chopping Machine by mechanizing a conventional manual fries maker. Traditionally, such chopping devices rely on human force to push vegetables through a cutter grid, which can be time-consuming and physically demanding. To overcome this limitation, a 12V DC wiper motor is integrated into the system to automate the cutting process.*

The core working principle involves the conversion of rotary motion to linear reciprocating motion using a crank-slider linkage mechanism. The continuous rotary output of the wiper motor drives the mechanical linkage, which in turn creates a vertical up-and-down motion. This reciprocating action applies consistent force on the pusher plate, enabling it to press vegetables through the cutter blades efficiently and uniformly.

The structural framework is fabricated using mild steel wires, providing the necessary strength while keeping the overall weight low. A regulated 12V DC power supply is used to operate the motor, ensuring safety and energy efficiency.

This automation reduces manual labor, improves cutting uniformity, and enhances productivity, especially in settings like homes, hostels, and small-scale food stalls. The project highlights fundamental mechanical concepts such as motion transformation, force transmission, and practical automation, making it a valuable prototype in the field of low-cost kitchen automation..

Keywords: Automated Vegetable Chopping

I. INTRODUCTION

In today's fast-paced world, the demand for automation in day-to-day tasks is steadily increasing, especially in household and small-scale food processing operations. One such repetitive and time-consuming task is vegetable chopping. Manual chopping not only requires significant physical effort but also lacks consistency in size and precision. To address this issue, our project aims to automate the vegetable chopping process using a simple, cost-effective mechanism.

The concept for this project is inspired by the traditional manual fries maker, a kitchen tool designed to push vegetables like potatoes through a fixed cutter grid using hand pressure. While effective, its manual operation limits speed and efficiency, especially when large quantities of vegetables are involved. Our approach focuses on converting this manual device into a motorized, automated chopping machine

II. LITERATURE REVIEW

The effective management of kitchen waste has emerged as a critical component of modern sustainable development strategies, particularly in the context of rapidly urbanizing regions. Organic waste constitutes a significant portion of municipal solid waste (MSW) in India, and a considerable volume of it originates from household kitchens. Several research studies and experimental projects have laid the groundwork for small-scale, decentralized systems aimed at processing kitchen waste into useful by-products such as biogas and compost. This section presents a comprehensive review of existing technologies and methodologies relevant to the development of a temperature-controlled kitchen waste decomposer with biogas recovery capability

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III. WORKING PRINCLE

The working of the Automated Vegetable Chopping Machine is based on the principle of converting rotary motion into reciprocating motion to mimic the manual chopping action. A 12V DC wiper motor is used as the primary driving unit, which provides continuous rotary motion. This motion is transferred to a crank-slider mechanism that converts it into up-and-down linear movement.

This reciprocating motion is applied to the pusher plate of a plastic fries maker, which was originally designed for manual use. As the pusher moves downward, it forces the vegetable through a fixed cutter grid, slicing it into uniform pieces. Once the motor completes half a rotation, the mechanism pulls the pusher back up, ready for the next cycle

IV. FUTURE SCOPE

The automated vegetable chopping machine is a highly efficient and cost-effective solution for streamlining the vegetable preparation process. By automating the chopping mechanism, the system eliminates the need for manual labor, increases productivity, and ensures consistent, uniform vegetable pieces. It is powered by a 12V DC motor and utilizes a crank-slider linkage system to convert rotary motion into reciprocating motion, making it an ideal solution for commercial kitchens, food processing units, and catering services.

The system offers significant time savings and reduces the risk of injury associated with manual chopping. However, the system has limitations, such as its inability to handle very hard vegetables and the need for regular maintenance. Despite these challenges, the design provides an innovative approach to automate food preparation, making it a valuable addition to modern kitchens and food processing operations.

V. CONCLUSION

1. Automated Cleaning System

A self-cleaning feature could be added to the machine to enhance hygiene and reduce maintenance time. This could involve a built-in water spray or a rotating brush to automatically clean the cutting mechanism after each use.

2. Customization for Various Cutting Styles

The system could be designed with adjustable blades or cutters for different chopping styles, such as dicing, slicing, or julienning, making it more versatile for different food processing needs.

3. Energy Efficiency Improvements

Future improvements could focus on enhancing the energy efficiency of the system, perhaps by incorporating solar power for operation or optimizing motor efficiency to reduce energy consumption further.

4. Integration with IoT for Monitoring

The machine could be connected to the Internet of Things (IoT) to allow remote monitoring and control via a mobile app. This would enable users to track performance, receive maintenance alerts, and adjust settings from anywhere.

5. Modular Design for Easy Expansion

A modular design could allow for easy upgrades or additions, such as attaching new modules for other vegetable-processing tasks like washing, peeling, or sorting.

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