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Energy Generating Using Of Door Closer

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Abstract : *This project focuses on the development and integration of a system that combines several mechanical and electrical components to create a functional unit highlighting operational reliability through demonstrated applications. The core working elements include a door closer mechanism, a DC motor alternator, a drive belt and pulley system, small-sized gears, and a rechargeable battery—all of which converge to power a glowing LED indicator. The system initiates with the door closer, which utilizes a spring mechanism to ensure the door automatically returns to the closed position after being opened. This motion is harnessed by a small-sized gear that effectively transfers kinetic energy. The rotation is further assisted by a drive belt connected to a pulley, which amplifies the motion from the gear system. The heart of this apparatus is a DC motor alternator that is engaged when the gear rotates. The alternator converts mechanical energy into electrical energy, simultaneously charging a rechargeable battery. This integrated power source ensures the system can operate independently over time. Once the battery is sufficiently charged, it can power the glowing LED. The LED serves both a functional and aesthetic purpose, effectively indicating the operational status of the system, such as when the door is in motion or when the battery is fully charged. The glowing LED not only represents a successful energy conversion but also highlights the system's reliability and operational integrity. In summary, this document outlines a multi-component assembly that leverages kinetic energy to generate electrical power, demonstrating efficient energy conversion and functional reliability while providing a clear visual indicator of operation through a glowing LED. This project has potential applications in automated entry systems, energy-efficient lighting, and portable power solutions.*

Keywords – Door Closer Alternator (DC – motor), Drive belt and pulley, Small size gear, Chargeable battery, energy management, operational reliability, cost reduction, Lug terminal, case studies,Glowing LE

I.INTRODUCTION.

One such concept is the utilization of door closers as a source of power generation. Door closers, commonly used In an innovative approach to harnessing mechanical energy for electrical use, we can explore a system that integrates a door closer, a DC motor alternator, a drive belt and pulley, small-sized gears, a rechargeable battery, and a glowing LED light. The concept begins with the door closer, a device that automates the closing of doors with a spring mechanism. When the door is opened, the door closer's internal spring is tensioned, storing potential energy. Upon release, this energy can be transformed into kinetic energy, which can then be utilized to drive a DC motor alternator connected to the door closer through a drive belt and pulley system. As the door swings back to its closed position, the movement is transmitted via the belt and pulley mechanism, effectively rotating the DC motor's shaft. This rotation generates electrical energy through electromagnetic induction principles, allowing the alternator to convert mechanical energy into usable electrical energy. To optimize the system, the electrical output can be fed into a small-sized gear to enhance torque and improve efficiency. The generated electricity can then be stored in a rechargeable battery, ensuring that energy is available for later use. The final step in this energy conversion process is to power a glowing LED light, demonstrating a practical application of the harvested energy. This entire mechanism not only showcases an effective way to generate energy with simple mechanical processes but also exemplifies operational reliability, providing an energy-efficient solution to illuminate spaces when needed. Such a system illustrates the potential for integrating sustainable energy solutions into everyday life, utilizing automatic mechanisms to create a feedback loop of energy generation and consumption.

Door Closer Door closers are mechanical devices that automatically close doors after they have been opened. They enhance security, improve energy efficiency, and provide convenience in residential and commercial settings.Alternator (DC Motor) The alternator, specifically in the context of DC motors, is a crucial component that converts mechanical energy into electrical energy. This conversion is vital for powering various electrical devices and systems.Drive Belt and Pulley Drive belts and pulleys are fundamental elements in power transmission systems. They transfer rotational motion from one component to another, enabling the efficient functioning of machines and devices.Small Size Gear Small-sized gears are integral to mechanical systems, facilitating motion transfer, speed adjustments, and torque amplification. They play a critical role in precision engineering and machinery.Chargeable Battery Chargeable batteries serve as energy storage systems, providing power to electrical devices when needed. Their operational reliability is essential for uninterrupted performance, especially in portable applications.Operational Reliability Operational reliability pertains to the likelihood that a system will perform its intended function without failure. It is a critical aspect that relies on the quality and durability of individual components.Glowing LED LEDs, or light-emitting diodes, are popular for their energy efficiency and long lifespan. They are commonly used in indicators and displays, providing visual feedback in various applications.By delving into these components, we can appreciate their individual contributions and the cohesive functionality they provide in contemporary engineering.

II.METHODOLOGY

1. Cost-Effectiveness: - Assess the cost-benefit ratio of implementing the power generation system compared to traditional energy sources, ensuring it is economically viable for potential users.
2. Durability and Reliability: - Ensure that the system is robust and reliable, capable of withstanding frequent use without significant maintenance requirements.
3. User-Friendly Design: - Create a design that is easy to install and maintain, making it accessible for both residential and commercial applications.
4. Performance Metrics: - Establish clear performance metrics to evaluate the effectiveness of the power generation system, including energy output, installation time, and user satisfaction.
5. Environmental Impact Assessment: - Analyze the potential environmental benefits of implementing the door closer power generation system, including reductions in carbon footprint and energy consumption
6. Energy Conversion Efficiency: The system must effectively capture and convert the kinetic energy from the door's movement with minimal losses.
7. Mechanical Integration: The energy-harvesting mechanism should be seamlessly inegrated into existing door closer designs without compromising their functionality or safety.
8. Durability and Maintenance: The solution must be robust enough to withstand repeated mechanical stress while requiring minimal maintenance over time.
9. Cost-Effectiveness: The development and implementation of the energy-harvesting system should be economically viable, ensuring that the benefits outweigh the costs.

- **Block Diagram**

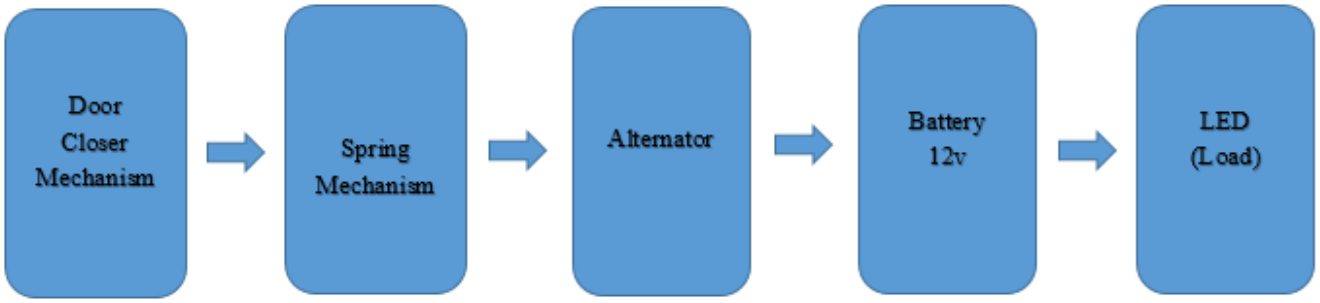

Fig .1. Block Diagram Of Energy Genperating Using Of Door Closer

III.CONCLUSION

The project on energy generation using a door closer demonstrates the potential to harness mechanical energy from everyday activities. By utilizing the motion of a door's closing mechanism, energy can be converted into usable electrical energy through a generator or other conversion system.This project exemplifies how mechanical actions, such as the simple act of closing a door, can be transformed into clean, usable electrical energy. By utilizing components like door closer, DC motors, and gearing systems, we can create energy generation appliance that not only powers small devices like LEDs but also encourages sustainable practices in daily life. As we continue to innovate and develop energy-efficient solutions, systems like this can play a pivotal role in promoting energy conservation.

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REFERENCES

1. Mechanical Energy Harvesting Using Piezoelectric Materials , Author: R. B. S. K. and H. S. .
2. Energy Harvesting: Principles and Technologies, Author: S. Priya and D. J. Inman
3. Design of Energy Harvesting Systems for Wireless Sensor Networks , Authors: Various
4. Power Generation from Door Movements , Author: Various (Research Papers/Theses)p
5. Piezoelectric Energy Harvesting from Vibrations , Authors: Various
6. Energy Harvesting: Solar, Wind, and Ocean Energy" by David A. W. Smith (2014).
7. Micro Energy Harvesting" by Thomas M. M. De Jonghe et al. (2016).
8. Roundy, S., Wright, P. K., Rabaey, J. (2003). "Energy Scavenging for Wireless Sensor Networks: A Survey." Wireless Networks, 12(3), 159-173.
9. Priya, S., Inman, D. J. (2009). "Energy Harvesting Technologies." Wiley.
10. Beeby, S. P., Tudor, M. J., White, N. M. (2006). "Energy Harvesting Vibration Sources for Micropower Generators." Energy, 31(12), 2580-2590.
11. Wang, Z. L. (2013). "Progress in Triboelectric Nanogenerators as a New Energy Technology and Self-Powered Sensors." Energy Environmental Science, 7(2), 1032- 1040.
12. Roundy, S., Wright, P. K., Rabaey, J. (2003). "Energy Scavenging for Wireless Sensor Networks: A Survey." Wireless Networks, 12(3), 159-173.