JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

FABRICATION OF BUTTON OPERATED DC GUN GEAR CHANGER FOR TWO WHEELER

Mr.D.Loganathan[1],Dr.N.Manikandan[2,] Harsath Rahman.M[3], Santhanam.M[4], Surendar.D[5], Bala Sanjeevi.M[6], Hariharan.M[7]

1-Assistant Professor,Department of Mechanical Engineering ,P.A.College of Engineering and Technology-

2- Associate Professor,Department of Mechanical Engineering ,P.A.College of Engineering and Technology3-Department of Mechanical Engineering ,P.A.College of Engineering and Technology-

4- Department of Mechanical Engineering ,P.A.College of Engineering and Technology.

5- Department of Mechanical Engineering ,P.A.College of Engineering and Technology.

6- Department of Mechanical Engineering ,P.A.College of Engineering and Technology.

7- Department of Mechanical Engineering ,P.A.College of Engineering and

ABSTRACT:

Our project's goal is to create a simple gear shifting system for a transmission that will make gear shifting for motorbike riders a breeze. Whatever the speed at which a person drives, everyone wants their vehicle to run smoothly. However, one of the most crucial systems in a vehicle that every engineer worries about is the gear shifting system, which ensures a smooth and comfortable ride for two- wheelers. A solenoid plunger is a basic device that allows us to adjust the gear to provide the required torque. Two solenoid plungers assist in the gear shifting process in this system. Two independent switches help with the upshifting and downshifting of gears. The DC cannon is connected to two switches by an adapter. It makes understanding how to create low-cost automation useful. Smooth operation is produced by applying DC GUN. They can be produced and changed in accordance with the applications by utilizing additional strategies. Having worked in this field, I have a wealth of practical expertise about purchasing, planning, assembling, and machining. Smooth operation is achieved through the use of an electro-magnetic coil. Button-operated DC GUN gear shifting systems are highly expensive initially, but they are very helpful for two-wheelers, car owners, and auto garages. This design can be developed and altered in accordance with the applications by utilizing additional techniques.

KEYWORDS*: Gear shifting,Gear tooth ,Wear,Button operated gear shifting.*

INTRODUCTION

The goal of this project is to create a very simple electromagnetic shift arrangement mechanism for a transmission that has gear wheels placed on a rotating gear shift on an axis. This mechanism will make gear shifting for motorbike riders extremely simple. Whatever the speed at which a person is driving, everyone wants their cars to run smoothly. However, one of the most crucial systems that engineers worry about in cars is the gear shifting system, which ensures a smooth and comfortable ride for two- wheelers. Numerous

advancements in automotive technology have been made, including the active steering system, ABS system, and other safety features that are designed to improve passenger comfort and safety. Our goal.desires for the smooth operation of the vehicle, regardless of the speed of pickup of the vehicle a person is operating, but one of the most important systems in a vehicle that every engineer is concerned about is the gear shifting system for ensuring a smooth and desired ride on their two wheelers. A simple mechanism is arranged solenoid plunger, which will assist us in changing the gear according to the desired torque. Gear shifting in this mechanism is accomplished through the use of two solenoid plungers. The gears are upshifted and downshifted using two independent switches.

Developing a simple electromagnetic shift arrangement for motorcycle transmissions represents a significant step towards enhancing the ease of gear shifting for riders. Amidst the myriad advancements in automotive technology, such as active steering systems and ABS for safety, the gear shifting mechanism remains a cornerstone for engineers striving to achieve a smooth and comfortable ride on two-wheelers. This project aligns with the industry's overarching goal of ensuring a seamless driving experience, transcending the speed at which the rider operates the vehicle.The innovative aspect of this project lies in its utilization of a solenoid plunger mechanism to facilitate smooth gear changes based on desired torque. In a landscape where complex systems often dominate, the simplicity of this arrangement stands out as a noteworthy feature. By focusing on the fundamental and crucial aspect of gear shifting, this project addresses the core concern shared by engineers – optimizing the gear shifting system for an ideal and desired ride.The mechanism's core functionality hinges on the strategic arrangement of solenoid plungers, providing an efficient means for gear shifting. The incorporation of two solenoid plungers introduces a versatile method for both upshifting and downshifting, adding an extra layer of adaptability to the system. The dedication of independent switches to each plunger enhances the precision and reliability of the gear-shifting process, ensuring a responsive and seamless transition between gears.As the automotive industry continues to evolve, solutions that prioritize simplicity and effectiveness gain significance. In the context of this project, the electromagnetic shift arrangement, driven by solenoid plungers, promises a streamlined and reliable solution that resonates with the universal desire for a smooth ride on two-wheelers. It symbolizes a practical and pragmatic approach to addressing a fundamental aspect of vehicle dynamics, ultimately contributing to an improved and enjoyable riding experience

PROBLEM IDENTIFICATION :

Evaluate the current gear-changing mechanisms of two-wheelers and identify prevalent issues or inefficiencies. Gather insights from two-wheeler riders by conducting surveys or interviews to understand their preferences and challenges associated with gear shifting. Scrutinize the existing gear-changing mechanisms, focusing on potential usability and safety concerns. Assess the feasibility and cost implications of implementing a button-operated DC gear changer, taking into consideration factors like space availability, power supply, and compatibility with various two-wheeler models. Consider the system's environmental impact concerning power consumption and component disposal. Following a comprehensive identification and analysis of the identified issues, proceed to design and prototype the button-operated DC gear changer.

PROBLEM RECTIFICATION:

Verify that the DC gun gear changer's electrical connections are all tight and free of corrosion. Look for any indications of wear or damage on the wiring. Check to make sure the battery voltage is at the proper level. Electronic components can experience problems due to low voltage. If needed, charge or swap out the battery. To make sure the button(s) are operating properly, test them. Any broken buttons should be replaced. Verify the continuity of the wiring connecting the button to the gear changer.

Examine the DC motor and actuator in charge of the gearshift. Make sure they can move freely and without obstruction. Inspect for broken parts or loose connections. Examine the electronic control unit (ECU) in charge of handling gear shifts. Verify that it is getting power and operating as intended. Should error codes exist.

LITERATURE REVIEWS:

An automatic gear change control device for a car and a method for operating it are disclosed. The vehicle's drive wheels and a load device are connected to an internal combustion engine's rotational output[1].The automatic transmission for geared motorcycles is the subject of the study that follows. Automation has grown in importance in the automotive industry thanks to modern technology. Therefore, we have designed, built, and discussed the automatic transmission in the geared bikes in this study. The study primarily focuses on individuals with disabilities who wish to ride bikes similar to heavy and light motor vehicles[2]. The main goal of this project is to improve the gear shifting process as quickly as possible by utilizing devices like an electrical motor, a belt, two pulleys, a compressor, a manual four-speed gear box, single pneumatic double acting cylinders, single pneumatic two position five ways directional control valves, and push buttons for the compressor[3].The goal of this project is to construct an incredibly basic electromagnetic shift gear system for a transmission that has gear wheels coordinated on a device that rotates around a hub, making the engine bicycle rider's gear shifting simple. All individuals desire the seamless operation of their cars, but among the most important systems that every automotive expert worries about are the moving components that ensure a comfortable and enjoyable ride for their motorcycles.[4]

COMPONENTS USED :

Fig.1.Frame

Fig.2.Push button

Fig.3.DC Gun

Fig.4.Gear Shifting Leve

Fig.5.Relay

WORKING :

Developing an electronic system to manage the gear shifting mechanism is necessary to create a button-operated DC gun gear changer for a two-wheeler. This is a condensed synopsis of the procedure and possible outcomes. It would require parts like buttons, a DC motor, a gear shifting mechanism, and a microcontroller (like an Arduino). Design a circuit that joins the input pins of the microcontroller to the buttons and the output pins of the motor to the DC. Ascertain appropriate grounding and power supply. Code the microcontroller to recognize button presses and adjust the DC motor in response. Describe the code's gear shifting sequence. the gear lever on a two-wheeled vehicle to connect the system. Make sure that when you press the buttons, it shifts gears precisely and consistently. Incorporate safety measures to stop gear changes when they shouldn't be made (such as when the car is traveling too quickly or isn't in a neutral position). Interface: To inform the rider about the current gear, think about including an LED display or some other kind of feedback

A two-wheeler's button-operated DC gun gear changer usually uses an electromechanical system to change gears. Here is a streamlined operation concept. The gear changer control unit receives an electrical signal from the rider when they press a button on the handlebar. After processing the input signal, the control unit decides whether to shift up or down depending on the rider's input and the current gear. The gear lever, which is connected to the motor actuator, is in charge of actual system.Developing an electronic system for a button-operated DC gun gear changer on a two-wheeler involves meticulous circuit design and coding to ensure seamless gear transitions. The core components include buttons, a DC motor, a gear shifting mechanism, and a microcontroller, such as an Arduino, to orchestrate the entire process.

To begin, the circuit should be structured to connect the input pins of the microcontroller to the buttons and the output pins to the DC motor, with careful attention to grounding and power supply for optimal functionality.In the coding phase, the microcontroller needs to be programmed to recognize button presses and, in turn, adjust the DC motor accordingly. Crafting a precise gear shifting sequence is crucial to ensure that when the rider presses the buttons, the gears shift accurately and consistently. Safety measures are paramount, preventing gear changes when the vehicle is traveling too quickly or isn't in a neutral position. This could involve incorporating sensors or checks in the code to assess the vehicle's speed and position before allowing a gear change.The gear lever, intricately connected to the motor actuator, plays a pivotal role in translating the electronic signals into physical gear shifts. It becomes the mechanical intermediary between the digital commands from the microcontroller and the actual gear shifting mechanism. To enhance the user experience and provide real-time feedback, an interface such as an LED display can be integrated. This display would communicate the current gear to the rider, offering a visual confirmation of the system's status.Implementing these measures ensures not only the effectiveness of the electronic system but also the safety and reliability of the button-operated DC gun gear changer for two-wheelers. The synergy between precise circuit design, meticulous coding, and thoughtful safety considerations forms the foundation for a seamless and user-friendly gear shifting experience.Button-Operated Concept.

The introduction of a button-operated DC gun gear changer for two-wheelers presents a novel approach to

gear shifting. Departing from traditional manual methods, this innovation integrates electronic components for a modern and user-friendly experience.Microcontroller Integration: The use of a microcontroller, such as Arduino, adds a layer of intelligence to the gear-changing process. This novel application of technology allows for precise control, customization, and potential future enhancements.Seamless Gear Shifting Sequence: The detailed description of the coding and gear shifting sequence adds novelty by showcasing a thoughtful and systematic approach to ensuring accuracy and consistency in gear transitions. This meticulous planning sets the system apart from rudimentary electronic gear shifters.Safety Measures: Incorporating safety features, like preventing gear changes at high speeds or in improper positions, demonstrates a novel focus on rider well-being. These measures contribute to a safer and more reliable riding experience, distinguishing this system from conventional setups.

Real-Time Feedback Interface: The suggestion to include an LED display for real-time feedback on the current gear adds a novel dimension to the user interface. This not only enhances user engagement but also provides a practical solution for riders to stay informed about their vehicle's status.Electromechanical System Overview: The mention of an electromechanical system for gear shifting introduces a novel perspective, highlighting the synergy between electronic components and mechanical actions. This integration demonstrates a holistic approach to designing a comprehensive and functional system.Motor Actuator Connection: The description of the gear lever intricately connected to the motor actuator brings a novel understanding of how digital commands translate into physical actions.

This mechanical intermediary plays a crucial role in ensuring a smooth and reliable gear-shifting mechanism.Thoughtful Circuit Design: The emphasis on careful circuit design, including appropriate grounding and power supply considerations, reflects a novel attention to detail. This approach ensures the optimal functioning of the entire electronic system, distinguishing it from hastily designed alternatives

CONCLUSIONS:

In conclusion, the development of a button-operated DC gun gear changer for two-wheelers involves a meticulous integration of electronic and mechanical components. The outlined procedure emphasizes the necessity of an electronic system to manage gear shifting, incorporating buttons, a DC motor, a gear shifting mechanism, and a microcontroller like Arduino. The design of the circuit, coding of the microcontroller, and implementation of safety measures contribute to creating a sophisticated system that ensures precise and consistent gear shifts while prioritizing rider safety and control.

The streamlined operation concept, common in two-wheelers, utilizes an electromechanical system for gear changes. The gear changer control unit receives signals from the rider through a button on the handlebar, processing the input to determine the appropriate gear shift. The gear lever, connected to the motor actuator, physically executes the shift, offering a seamless integration of electronic commands into mechanical action. Safety features are embedded to prevent untimely gear changes, enhancing the overall reliability of the system.The consideration of an interface, such as an LED display, adds an informative layer for the rider, providing real-time feedback on the current gear. This user-friendly feature enhances the overall riding experience. Furthermore, the possibility of manual override mechanisms in case of system failure ensures that riders have a reliable fallback option, maintaining control over gear shifts even in adverse conditions.In essence, the project not only introduces innovation in gear-shifting technology for two-wheelers but also underscores the importance of a holistic approach. By addressing usability, safety, and environmental impact, the button-operated DC gear changer stands as a testament to the continuous evolution of automotive technology, aiming to deliver a seamless and enjoyable riding experience for motorbike enthusiasts.

ADVANTAGES:

- **Precision in Gear Shifting**: The electronic system, driven by a microcontroller, ensures precise gear shifts in response to button presses, eliminating the variability often associated with manual gear changes.

- **Adaptability and Customization**: The use of a microcontroller like Arduino allows for easy customization of the gear-shifting sequence, accommodating various rider preferences and adapting to different two-wheeler models.

- **Efficient Electromechanical Integration**: The gear lever, linked to the motor actuator, seamlessly translates electronic signals into physical gear shifts, creating a smooth and efficient electromechanical integration for enhanced reliability.

- **Safety Features**: The incorporation of safety measures prevents gear changes in inappropriate situations, such as high-speed travel or when the vehicle is not in a neutral position, enhancing rider safety and overall system dependability.

- **Real-Time Rider Feedback**: The addition of an interface, like an LED display, provides riders with real-time feedback on the current gear, enhancing user awareness and contributing to a more informed and confident riding experience.

- **Environmental Considerations**: By evaluating power consumption and component disposal, the system demonstrates a conscious approach to environmental impact, aligning with modern concerns for sustainable and eco-friendly technology.

- **Manual Override Mechanism**: The provision of a manual override mechanism offers riders a fail-safe option in the event of system failure, ensuring continuous control over gear shifts even under challenging conditions.

- **Compatibility and Space Optimization**: Careful consideration of factors like space availability and compatibility with various two-wheeler models contributes to a design that is versatile, adaptable, and optimized for diverse applications in the automotive industry.

REFERENCES:

[1] R Sabarish, Dr M Kumar International Journal of Psychosocial Rehabilitation 23 (4), 2019 There are disclosed an automatic gear change control apparatus for an automobile and a method of controlling such apparat

[2] D Patil, H Patil, K Pandit, SB Dhoot Int Res J Eng Technol, (2019)The following study is about the automatic Transmission for the geared bikes.

[3] Trupans Gandhi, Sagar Bhavsar, Jay Shah, Tejas Solanki, Jay I Patel (2019) Gear shifting mechanism was designed & applied to make the shifting process faster and less

[4] Harpal Singh, Sai Anith, Naveen Kumar, Sai Prasanth, Sai Bhilvesh, (2019) This undertaking targets building up an exceptionally simple system

[5] Shivam Dwivedi, Vikas Gupta, (2018) For the vehicle to move forward the engine has to be connected to driving wheels so as to propel the vehicle.

[6] Aditya A Mairal, Akash B Pandey.(2018) Purpose of this paper is to develop a system for automatic gear change of two-wheeler automobile which is rugged and easy to mount on any geared motorbike peripherally.

[7] Vishnu P. R. et.al(2016)This technique takes time for shifting of gear and sometimes the gear don't mesh properly due to which life span of gears werereduced.

[8] A Mankar, D Keshar, R Minde, AH Khaja Abulfaiz, SE Barhe Int Res J Eng Technol (2016) In this paper, a gear shifting mechanism was designed and applied to make the shifting process more expeditious and less destructible for the driver.

[9] Toru Ishino, Shinichi Takai SAE Technical Paper, (2015) When selecting a transmission gear.

[10] Subramani, N., R. Haridass, R. Krishnan, D. Loganathan, and N. Manikandan. "Mechanical characterization of aluminium 6061 hybrid metal matrix composites." *Materials Today: Proceedings* 65 (2022): 3959-3965.

[11] Manikandan, N., C. Sabarinathan, N. Zeelanbasha, and VP Suresh Kumar. "Wear and hardness investigation of cryogenic treated epoxy reinforced with hybrid nano composite." *Digest Journal of Nanomaterials and Biostructures* 15 (2020): 905-912.

[12] Mohan Prasad, M., N. Manikandan, and S. M. Sutharsan. "Investigation on mechanical properties of reinforced glass fibre/epoxy with hybrid nano composites." *Digest Journal of Nanomaterials & Biostructures (DJNB)* 16, no. 2 (2021).