Button Operated Electromagnetic Gear Shifting System in Two Wheeler

Vinod Ranavare[1*], Sudarshan Patale[2], Kiran Mane[3]

[1,3]Department of Mechanical Engineering, S.M.S.M.P. Institute of Technology & Research, Akluj, Maharashtra, India.
[2]Department of Mechanical Engineering, Karmayogi Engineering College, Shelve Maharashtra, India.

*Corresponding author
doi: https://doi.org/10.21467/proceedings.118.25

ABSTRACT

There are disclosed an electromagnetic Type Gear Change System control apparatus for an automobile and a method of controlling such apparatus. A rotational output of an internal combustion engine is connected to drive wheels of the automobile and a load device. When a gear shifting-up of a electromagnetic type transmission is to be effected, the load applied by the load device is increased, or the load is connected to an output rotation shaft of the engine via a selectively-connecting device, thereby reducing the rotational speed of the output rotation shaft of the engine to a required level. In our project, two electromagnetic coils are coupled to the gear rod of the two ends. The two Buttons are used to activate the electro-magnetic coil so that the gear will be shifted. In this project, we aim at developing easy gear shifting mechanism for transmission which will make motor bike rider's gear shifting very easy. Everyone desires for the smooth running of the vehicle whatsoever may be the speed of pickup of the vehicle a person is operating, but one of the most important systems which every engineer is concerned about in vehicle is gear shifting system for ensuring smooth and desired ride on their two wheelers. Some simple mechanism is arranged solenoid plunger which will help us to change the gear as per the desired torque. In this gear shifting mechanism, gear shifting is done with the help of two solenoid plungers. The up shifting and downshifting of gears is done with the help two independent switches. These two switches are connected to solenoid plungers via battery.

Keywords: electromagnetic, buttons, Four stroke engine, gear box

1 Introduction

A method of controlling a gear change of an automobile, said automobile comprising an internal combustion engine. An automatic transmission connected to an output rotation shaft of said engine so as to transmit the rotational output of said engine to drive wheels of said automobile through any selected one of a plurality of gear ratios. a load device selectively connectable to said output rotation shaft of said engine via selectively-connecting means; and means for generating a gear change control for selecting one of said gear ratios of said automatic transmission in accordance with one of operational conditions of said automobile and said engine said method comprising the steps of controlling said selectively-connecting means when said gear. An automatic gear change control apparatus for an automobile, said automobile comprising an internal combustion engine.

An automatic gear change control apparatus for an automobile, comprising an internal combustion engine; an automatic transmission connected to an output rotation shaft of engine so as to transmit the rotational output of drive wheels through any selected one of gear ratios; apparatus comprising a load device for applying a load; means for connecting load device to output rotation shaft of engine and for generating a gear change control signal for selecting one of gear ratios of automatic transmission in accordance with one of operational conditions of automobile and said engine; and load control means for increasing the load of said load device when said gear change.

Proceedings DOI: 10.21467/proceedings.118; Series: AIJR Proceedings; ISSN: 2582-3922; ISBN: 978-81-947843-6-4

This project aims at developing a very easy mechanism of an electromagnetic shift arrangement for a transmission with gear wheels arranged on a gear shift rotatable about an axis, which will make the motor bike riders gear shifting very easy. Everyone is desired for the smooth running of their vehicles, what so ever may be the speed of pickup of the vehicle a person is operating, but one of the most important system which every engineer concern about in vehicles is the gear shifting system for ensuring smooth and desired ride on their two wheelers. Automotive technology has been developed in many areas, like ABS system, active steering system and other safety systems, which are implemented to increase the passenger safety and comfort. The development has concluded also the gearbox, which became much smoother and produces less noise. Gear shifting mechanism must be easy to use and workable, these demands are very important especially for physically challenged and special needs people. For some drivers, the gear shifting can cause some confusing at driving specially at critical situations. A crowded road on a hill or a sudden detour makes a lot of tension on the driver. So, our project is determined to give rider a hassle free ride.

The two buttons are used to activate the electro-magnetic coil so that the gear will be shifted. An automatic gear change control apparatus for an automobile, comprising an internal combustion engine; an automatic transmission connected to an output rotation shaft of engine so as to transmit the rotational output of drive wheels through any selected one of gear ratios; apparatus comprising a load device for applying a load; means for connecting load device to output rotation shaft of engine and for generating a gear change control signal for selecting one of gear ratios of automatic transmission in accordance with one of operational conditions of automobile and said engine; and load control means for increasing the load of said load device when said gear change signal-generating means generates the control signal for shifting up the gear in automatic transmission. Increasing demands on performance, quality and cost are the main challenge for today's automotive industry, in an environment where every movement, component and every assembly operation must be immediately and automatically recorded, checked and documented for maximum efficiency. Automotive technology has been developed in many areas, like ABS system, active steering system and other safety systems, which are implemented to increase the passenger safety and comfort. The development has concluded also the gearbox, which became much smoother and produces less noise. Gear shifting mechanism must be easy to use and workable, these demands are very important especially for small cars used by special needs people. For some drivers, the gear shifting can cause some confusing at driving specially at critical situations. A crowded road on a hill or a sudden detour makes a lot of tension on the driver. One of the difficulties in this situation is to choose the right reduction ratio and engaging it at the right time.

2 MATERIALS AND METHODS COMPONENTS AND DESCRIPTION

- Battery,
- Electromagnetic coil,
- Frame,
- Button
- Gear rod.

2.1 BATTERY

In isolated systems away from the grid, batteries are used for storage of excess solar energy converted into electrical energy. The only exceptions are isolated sunshine load such as irrigation pumps or drinking water supplies for storage. In fact, for small units with output less than one kilowatt. Batteries seem to be the only technically and economically available storage means. Since both the photo-voltaic system and batteries are high in capital costs.

2.2 ELECTROMAGNETIC COIL

The key to understanding the role of permanent magnet's gear shifting lies in the general issue of biasing. Consider the simplest magnetic as shown in the figure, but omit the lower electromagnet. By omitting the finite permeability of the iron, the current in the coil controls the flux density. The key to understanding the role of permanent magnet's gear shifting lies in the general issue of biasing. By omitting the finite permeability of the iron, the current in the coil controls the flux density. The force, which was generated by shifting the gear, is related to the square of the magnetic flux density in the gaps between the pole faces and the shaft. Consequently, it is only possible to pull the shaft toward the magnet; it is not possible to push the shaft.

Figure:1. Electromagnetic Solenoid

2.3 FRAME

This is made of mild steel material. The whole parts are mounted on this frame structure with the suitable arrangement. Boring of bearing sizes and open bores done in one setting so as to align the bearings properly while assembling. Provisions are made to cover the bearings with grease.

Fig: 2. Vehicle Frame

Proceedings DOI: 10.21467/proceedings.118
ISBN: 978-81-947843-6-4

Series: AIJR Proceedings
ISSN: 2582-3922

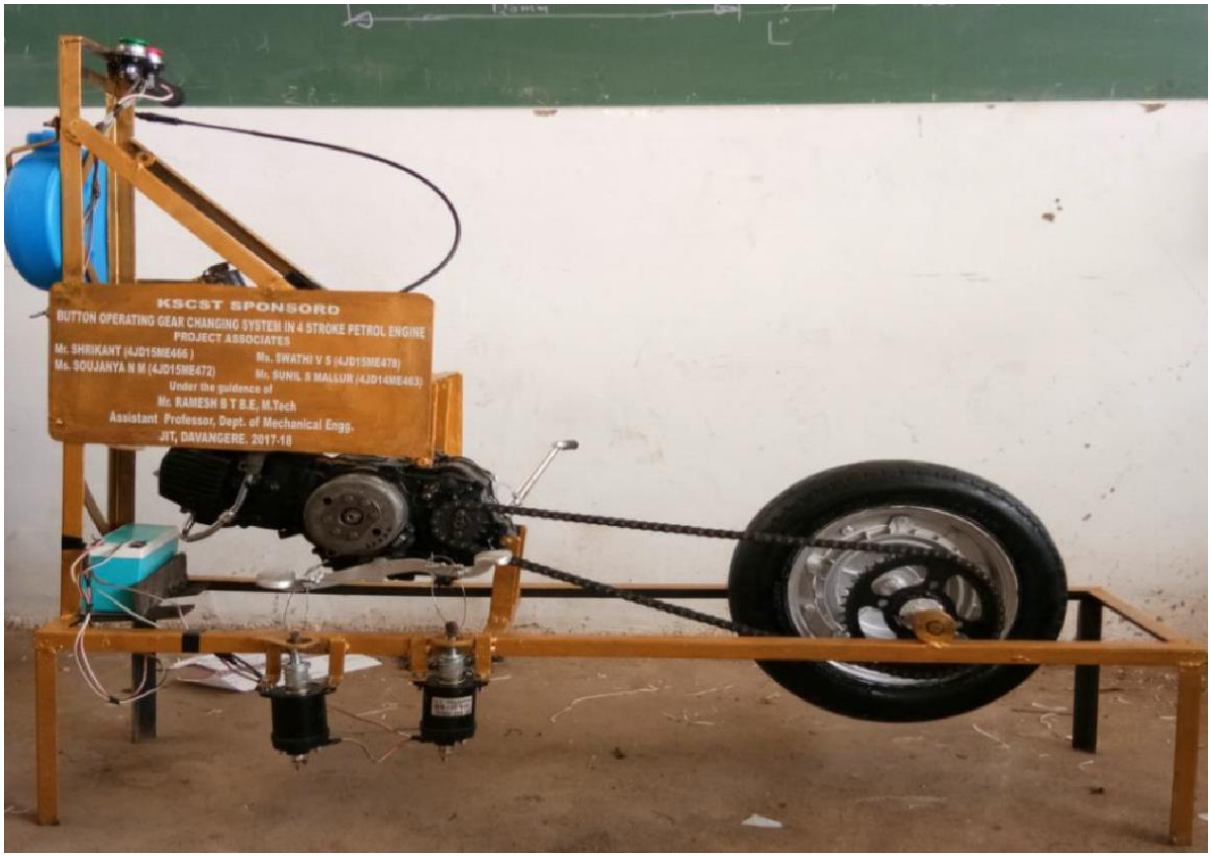

Fig 3 Working model

2.4 BUTTONS

A and the circuit is now closed Normally Open (NO) Push Button is a push button that, in its default state, makes no electrical contact with the circuit. Only when the button is pressed down does it make electrical contact with the circuit. When the button is pressed down, the switch makes electrical contact.

Fig:4. Buttons for the operation

2.5 GEAR ROD

The idea is to get the blue gear of the next gear and the collar rotating at the same speed so that the dog teeth can engage. Then you push the clutch pedal in again and lock the collar into the new gear. You can also see how a small linear motion in the gear shift knob allows you to change gears

Fig:5. Gear rod

Fig 6 Construction of Electromagnetic Coil

3 WORKING PRINCIPLE

A method of controlling a gear change of an automobile, said automobile comprising an internal combustion engine; an automatic transmission connected to an output rotation shaft of said engine so as to transmit the rotational output of engine to drive wheels. Battery is giving the supply to the

Proceedings DOI: 10.21467/proceedings.118
ISBN: 978-81-947843-6-4

Series: AIJR Proceedings
ISSN: 2582-3922

electromagnetic coil. The two electromagnetic coils are fixed to the gear shaft of the two ends. One is used to shift the gear in upward direction. Another one is used to shift the gear in downward direction. These two coils are operated depends upon the activation of the button. Simple machines, such as the club and oar (examples of the lever), are prehistoric. More complex engines using human power, animal power, water power, wind power and even steam power date back to antiquity. Human power was focused by the use of simple engines, such as the capstan, windlass or treadmill, and with ropes, pulleys, and block and tackle arrangements; this power was transmitted usually with the forces multiplied and the speed reduced. These were used in cranes and aboard ships in Ancient Greece, as well as in mines, water pumps and siege engines in Ancient Rome. The writers of those times, including Vitruvius, Frontinus and Pliny the Elder, treat these engines as commonplace, so their invention may be more ancient. By the 1st century AD, cattle and horses were used in mills, driving machines similar to those powered by humans in earlier times.

The two electro-magnetic coils are fixed to the gear shaft of the two ends. One is used to shift the gear in upward direction. Another one is used to shift the gear in downward direction. These two coils are operated depends upon the speed of the vehicle this is automatically button operated electromagnetic gear changer for two wheeler.

To perform an automatic gear change control apparatus for an automobile and a method of controlling such apparatus. A rotational output of an internal combustion engine is connected to drive wheels of the automobile and a load device. When a gear shifting-up of an automatic transmission is to be affected, the load applied by the load device is increased, or the load is connected to an output rotation shaft of the engine via a selectively-connecting device, thereby reducing the rotational speed of the output rotation shaft of the engine to a required level. In this work, two electromagnetic coils are coupled to the gear rod of the two ends.

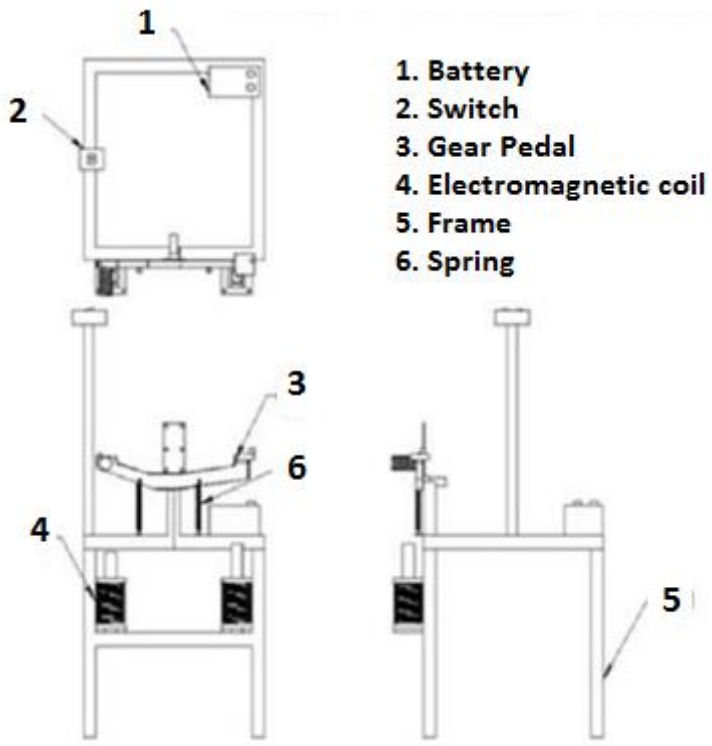

Fig: 7. 2d Drawing of fabrication of button operated gear shifting system structure

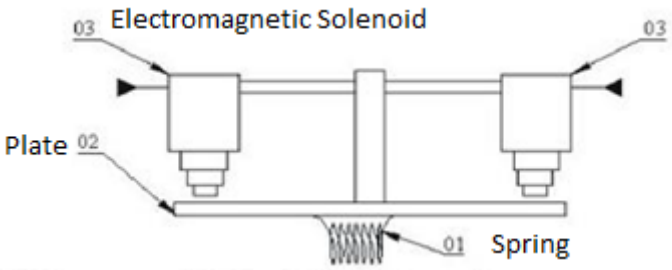

Fig 8 Button Operated Electromagnetic Gear Changer for Two wheeler

4 ADVANTAGES AND DISADVANTAGES

4.1 ADVANTAGES

- It requires simple maintenance
- The safety system for automobile.
- Checking and cleaning are easy, because of the main parts are screwed.
- Easy to Handle.
- Low cost automation Project
- Repairing is easy

4.2 DISADVANTAGES

- Initial cost is required.
- The system is complicated one.

5 CONCLUSIONS

The application of electro-magnetic coil produces smooth operation. Even though the initial cost of button operated electro-magnetic gear shifting system is very high, but it is very much useful for two wheelers.

REFERENCES

[1] P. Alexander M.E, T. Sudha M.E, M. Omamageswari M.E, “Automatic Gear Transmission in Two Wheelers using Embedded System”.

[2] July-December (2012), pp. 164-175. 2. Chunsheng Ni, Tongli Lu, Jianwu Zhang, School of Mechanical Engineering, State Key Laboratory for Mechanical System and Vibration Shanghai Jiao Tong University, 800 Dong Chuan Road, Shanghai, 200240 China, “Gearshift control for dry dual-clutch transmissions”

[3] J-O Hahn1, J-W Hur, G-W Choi, Y M Cho and K I Lee. Department of Mechanical Engineering, Korea AirforceAcademy, South Korea, “Self-learning approach to automatic transmission shift control in a commercial construction vehicle during the inertia phase”.

[4] Inalpolat. M. and A. Kahraman, 2008. “Dynamic modelling of planetary gears of automatic transmissions. Proc. I Mech E Part D”, J. Automobile Eng., 222: 229-242

[5] Glielmo, L., L. Lannelli and V. Vacca, 2006. “Gearshift control for automated manual transmissions”.

[6] Pettersson, M.; Nielsen, L - Gear shifting by engine control.

Proceedings DOI: 10.21467/proceedings.118
ISBN: 978-81-947843-6-4

Series: AIJR Proceedings
ISSN: 2582-3922