



AUTOMATIC GEAR SHIFTING MECHANISM FOR TWO-WHEELER AUTOMOBILE

Harsh Oza¹, Jatin Vachheta², Yash Shah³, Prof. Jay Shah⁴, Prof. Chintan Patel⁵

Student¹, Student², Student³, Assistant Professor⁴, Assistant Professor⁵

¹Department of Mechanical Engineering

¹Alpha College of Engineering and Technology, Ahmedabad, Gujarat, India

Abstract —

During traffic on road the bike rider continuously change the gear. By foot movement, changing of gear is not easy during traffic. While concentrating on traffic sometimes, bike driver forgets the gear number and bike turns off due to invalid gear which cause great problem in traffic. The main objective of this concept is used to apply the gear by using automation system in automobile vehicles. This is the new innovative model mainly used to control the vehicle. Here we are concentrating to design the automatic gear changing mechanism in two-wheeler vehicles by using the electronic devices. This is very useful for the gear changing mechanism in automobile vehicles. By using this we can easily control the vehicle and improve the performance of the vehicle also we can avoid the wear and tear of the vehicle.

Keywords – Automatic Gear Shifter, Pneumatic actuator, solenoid valve.

I INTRODUCTION

Traditional scooters still have manual gear-changing by a twist grip on the left-hand side of the handlebar, with a co-rotated clutch lever. Modern scooters were often fitted with a throttle-controlled continuously variable transmission thus earning the term twist-and-go. Under bone and miniature motorcycles often have a three to five-speed foot change, but the clutch is automatic.

II LITERATURE SURVEY

The real time data is sensed and the gears are changed automatically so as to give the rider a comfortable ride. This project is most useful for handicap persons those who cannot drive the two wheelers because due to gear shifting problem. After achieving the desired gear shifting technology, we ever able to get a smooth ride in all city conditions. In This Study, A Gear Shifting mechanism was designed and applied to make the shifting process faster and less destructible for the Driver. Pneumatic control system is disclosed for an automatic transmission for vehicle of the type having a mechanical planetary gear train with hydraulically actuatable elements. IN order to Achieve shifting gear Automatically for that taste bed, this article Introduces one system Which uses screw and cylinder to drive the shifting rod to move in two different direction. This system is flexible and can be implemented on a motorcycle available in the Indian market without any modification. By installing this low cost system in their motorcycle. Companies may also be able to increase their sale. This button actuate stepper motor which is connected to cam operating shaft instead of pedal of gear. Stepper motor is programmed to turn at specific angle which in turns shift the gear. We aim for developing a very easy mechanism of an electromagnetic (solenoid) 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.

Summary of Literature Review: To avoid gear shifting by foot, our project help to bike rider by shifting gear by hand which is easy to use. The digital indicator or light shows the number of gear at which bike is running. The person who very fond of two wheeler and specially in bike, he/she can easily ride the bike and enjoy their trip. Moreover handicapped person can easily ride the bike without any kind of accident.

III OBJECTIVE & METHODOLOGY

Our actual fabricated model is based on the design We have proposed is very useful for specially challenged people and with very less efforts they can easily shift gears of two wheeler equipped with our tuber cutted mechanism. Human effort required for shifting the gears is remarkably reduced & from 282 74 N to almost 0 N. (Nothing)

For making final prototype of automatic gear shifter we need following :

Hardware Requirement: Paddle / Lever, Actuator, Direction Control Valves, Push Button etc

Software Requirement: SolidWorks (For making Design of Multipurpose m/c), Microsoft office (Presentation/ Report Generation), For making the gear shifting automatically, we will use pneumatic operated mechanism.

IV DESIGN AND CALCULATION

Force required for upward gear shifting=4.2 kg(45 N). Force required for downward gear shifting=4.8kg(41N). Therefore the approximate force required for upward and downward shifting of the gear is about 50N. Therefore we have decided to used an actuator of 50N force for both the upward and downward shifting. This will be enough to push the lever and also not deform/distort the lever. This is almost equivalent to the force applied by the human foot. Now, the pressure source that we are using in our model is a centrifugal type air compressor (20.7 bar).

Calculating of Actuating for shifting the gear

-The Diameter of piston. $D=30\text{mm}$ -The Diameter of pushrod $d=10\text{mm}$

-The cross section area of piston $A: \pi D^2 / 4$ -The cross section area of push rod $a: \pi d^2 / 4$

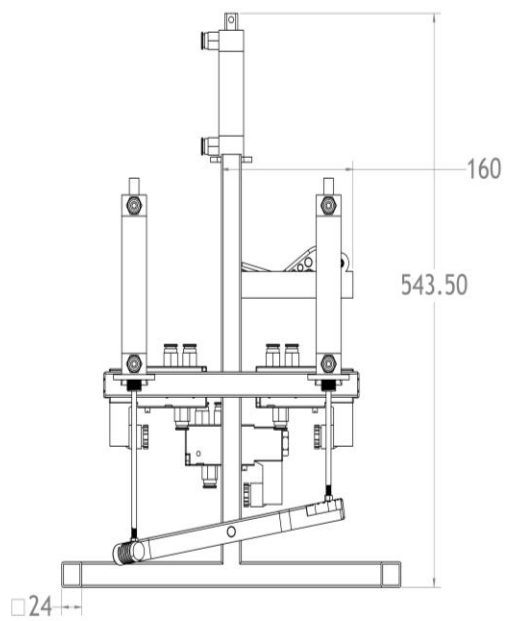
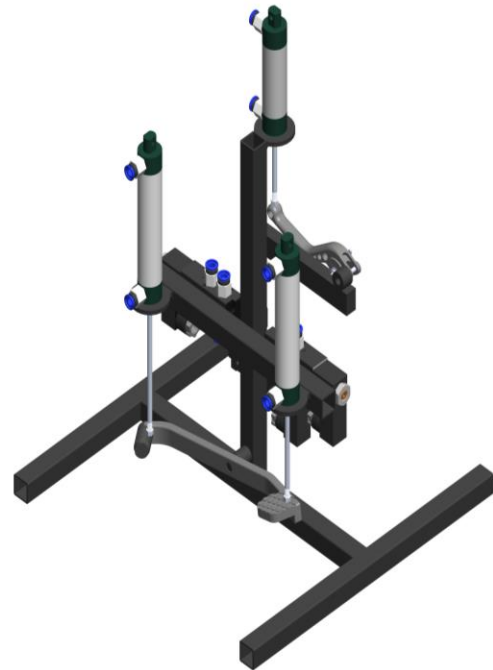
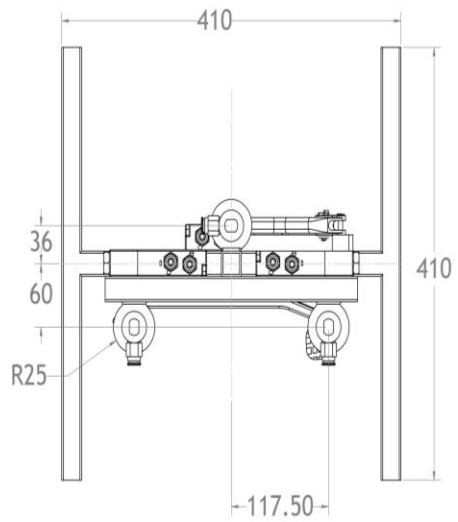
$P =$ Pressure of compressed air is 4 bar Now the force applied for changing the gear from high gear to low gear. $F = P * A$ $F = p * \pi d^2 / 4$

$F = (4 * 10^5) * \pi (30 * 10^{-3})^2 / 4$ $F = 282.74 \text{ N}$

Now the force applied for changing the gear from low gear to high gear is same as above. i.e =282.74 N

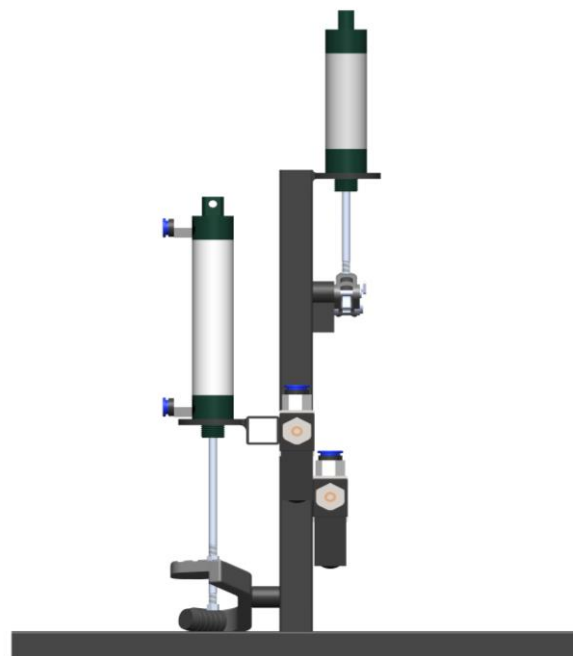
As we can see, the forces exerted by the actuators are enough for shifting gears.





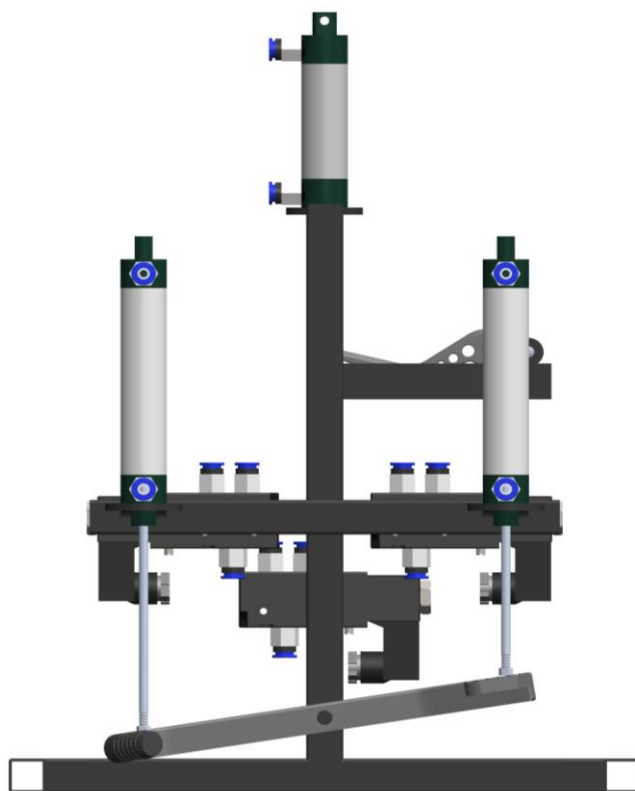
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Fig.1 (2D,3D view)



Side View

Fig.2



Proposed Body Design-Front view

Fig.3

V TESTING OF REAL MODEL



Fig.4

VI CONCLUSION

Our actual fabricated model is based on the design We have proposed is very useful for specially challenged people and with very less efforts they can easily shift gears of two wheeler equipped with our developed mechanism. Human effort required for shiftingss the gears is remarkably reduced from 282.74 N to almost 0 N. (Nothing)

Future scope: This System can also be operated with hydraulic and Electric power. To make the system more compact one can modify the existing design of our working model. To make the frame lighter one can use the different lighter material for the frame.

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*Corresponding author journal of Recent Trends in Mechanic Volume 3 Issue 2

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