

# New Gear Shifting Method by using Button

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**Abstract**— Today the research is going on how to improve the safety of the person and how to drive smoothly. But the gear shifting Method is same for old method. In many person feeling suddenly changing gear (traffic signal and sometimes gear in scooter. And then this project is very suitable for sports bike and then super-fast bike. So this project is very useful for gear shifting method (hand to hand) by using button format (switch type model). To press the upward button to increase the gear and to press the downward button to decrease the gear. The gear shifting method is very easy for handling all women's and children's. This project introduce in bike is very simple and then design structure to get the new look in your bike. The air shifting main disadvantage is more sound and shaking of whole system. This problem reduce this project by using new type of cylinder. This project also using troubleshooting format for gear shifting in present method (using leg) and new method(using button) like customer thought. Project include atmospheric air, tank, cylinder and then spool type solenoid valve.

**Keywords:** Safety, Without Sound, Shaking, Troubleshooting, Customer Thought

## I. INTRODUCTION

Now the traffic signal is more and then people population is also very high. So traveling vehicle is high. To travel vehicle in normal road is very difficult in present situation. The first to still changing gear in bike is commonly using for leg. In this Method is difficult to handle the newly person. So many times to drive the experience is Very important. My thought how to reduce the fear for changing gear in bike. Now this Project is very useful for reduce the fear and workforce in changing gear. In this project Consist of switch type model. This project analysis whole think of shifting gear (Like that sound and shaking of the hole system). This problem is reduce this project by using new cylinder as shown in below conversation. In the way on / off / decrease the gear. In small changing this project is also using for car.

## II. CONSTRUCTIONAL DETAILS

### A. Medium:

Atmospheric air

### B. Switch:

Switch is consist of upward and downward (on-off-on format) button. Central position is neutral. The switch is present the left hand side. Because this position easy to handling the switch and thump finger is used for shifting the gear.

### C. SPDT (single pole double throw) Switch:

The single pole double throw switch is connected to battery. This switch use Direct the current flow to divide in two routes according to position. The switch using Battery current

passing through spool solenoid valve and actuated two spool movement.

### D. Tank (or) Compressor:

Tank is consist of require level. Because mostly gear shifting acting in running condition. This tank is consist off fan blade (suck the air type). It is useful for increase the pressure level of air. This fan blade introduce front of the bike. So fan blade rotate bike moving condition and also increase the pressure level of air in inside the tank. And this fan blade took the new look in your bike. And then to introduce the pressure relief valve to maintain the constant level of air in inside of the tank. The tank is consist of check (one way flow) valve.

### E. Cylinder:

The cylinder consist of new type of piston. This piston include extra blade cover part. And spring present in blade cover end. The spring used to reduce the noise and return to original position in piston. This blade cover part is very essential. Because the shift actuate level is limited. The limit level is equal for open the air in exhaust as shown in fig 1. The exist air opening is used to reduce the shaking of hole system. Like that the pressurized air to down the piston. So, the piston to actuate the some action. This action level is equal to open the exist air. The action is completed the pressurized air going to outside by using exist air opening. So, the pressure level is reduce inside the cylinder, and piston to going original position by using spring. This system is very precise and reduce the sound and then shaking of the whole system.

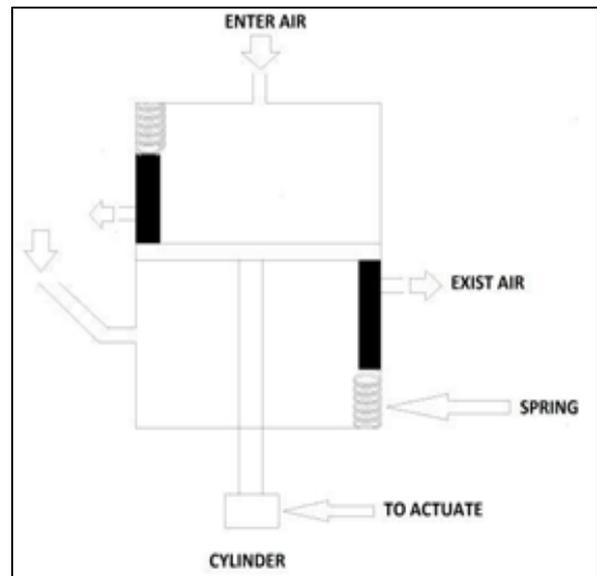


Fig. 1:

### F. Piston:

This type of piston is consists of extra blade cover part. This extra cover part is very essential. Because the movement of shifting rod is limited. The spring is present end of the extra cover part.

**G. Spool Type Solenoid Valve:**

This type of solenoid valve consist of spring. To press the upward button the Electricity pass through the magnetic rod. So the rod move to forward and the air pass through the port A. And then the gear is shifting forward. Next to press the downward Button the magnetic rod move to reverse. So the air pass through port B. And then the Gear shift backward. This position suddenly change to original position. Because the spring is present.

**H. U Shape Plate:**

In normal shifting method is same and just introduce U shape plate as shown in fig 2 and 3. This u shape plate center position is connect to shifting arm. And then right side U shape plate extra connection is easy convenience for shifting gear. The cylinder rod connect to left side U shape plate. The cylinder rod push the U shape left side plate to move upside the right plate. The movement is same for reverse. This plate is used to easy movement of shifting arm.

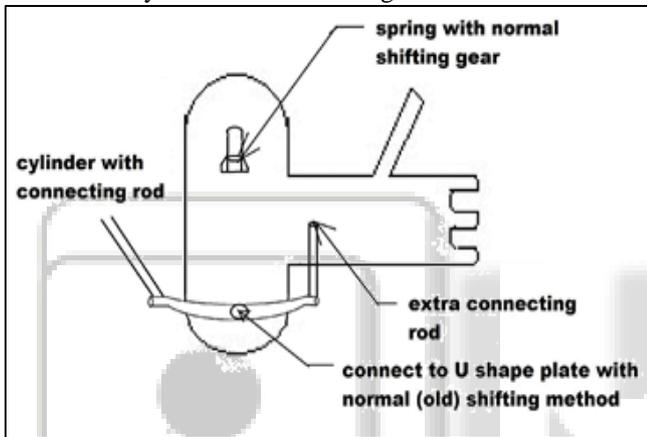


Fig. 2: Shifting Arm



Fig. 3: In Bike View

**III. ACTUAL DESIGN**

**A. In Normal Position:**

In normal condition connection as shown in fig 4. The cylinder rod Movement is fraction of second. Because the air is pressurized. The spring is present in Piston plade head. So the cylinder rod suddenly move to return position. In both action is same for old (present) shifting method. In new (button format) gear shifting method is very precision and easy convenience to compare old (present) method. In this new gear shifting method is using for troubleshooting

method. Like that the people thought to use old (using leg) method (or) new (using button) method is same for self-start & Kick method.

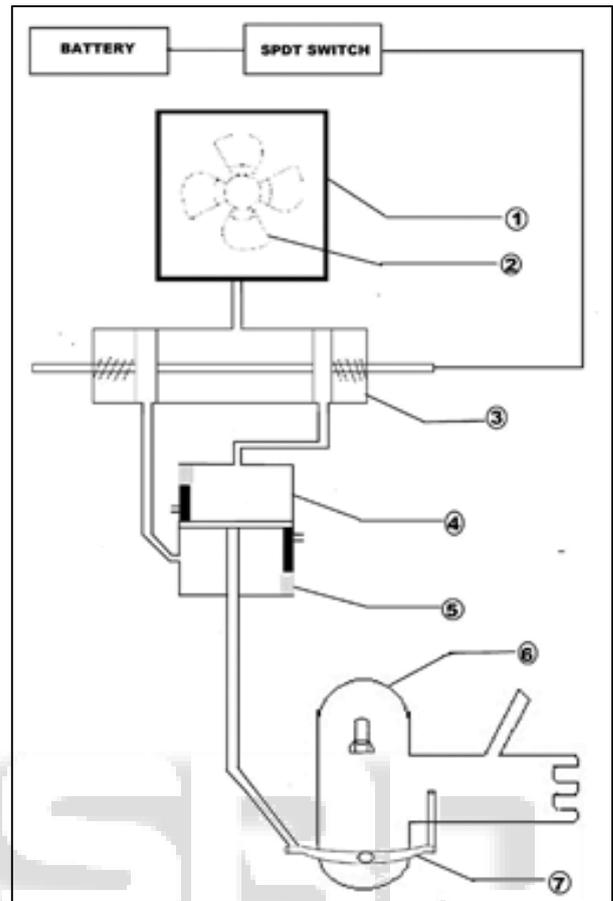


Fig. 4: In Normal Condition

- 1) TANK (OR) COMPRESSOR
- 2) FAN BLADE
- 3) SOLINOIDVALVE
- 4) CYLINDER
- 5) SPRING
- 6) SHIFTING ARM
- 7) U SHAPE PLATE

**B. To Press Upward Button:**

To press the upward button the current passes through the dcv valve. So dcv Valve open the port A. The pressurized air going to port A and to press the upward in the piston. So this action to shift the gear in forward. This action is completed the piston move to original position. Because the spring and exist air opening is present. This action take in fraction of second. This gear shifting method is very smooth compare to old (present) method and without sound and shaking of the system.

**C. To Press Downward Button:**

To press the downward button the current passes through the dcv valve. So the DCV valve open the port B. The pressurized air going to port B and to press the downward in the piston. So this action to shift the gear in backward. In this action take in fraction of second.

#### IV. DESIGN CALCULATION

For pneumatic cylinder  $F = P \cdot A$

Where  $F$  = Force required by the actuator to move the piston

$P$  = Pressure in the actuator Bar

$A$  = Area of the cylinder

Approximately the foot pressure is 5 Bar.

$$F = (5 \cdot 10^5) \cdot \pi / 4 \cdot D^2$$

$D$  = Bore Diameter

Approximately  $D = 32$

$$F = (5 \cdot 10^5) \cdot (\pi / 4) \cdot 32^2$$

$$F = 322 \text{ N}$$

This force is enough to change the gear by using this methods.

#### V. WORKING PRINCIPAL

To press the upward button the current pass through the solenoid valve. So the solenoid valve energized and open the port A. The SPDT switch control the solenoid valve and to open the current port. To open the port A the pressurized air going to downside cylinder. So this action to up the piston and to actuate the gear forward. The gear is changed the pressurized air going outside. Because the actuate level is equal for open the exist air opening in the cylinder. This structure is reduce the sound and shaking of the hole system. The pressurized air going outside the pressure reduce inside of the cylinder. So the piston come to original position by using spring. This action take in fraction of second. To reverse the gear this action is same but the port B is open. This connection is simple and easy method for shifting gear compare to old (present) method.

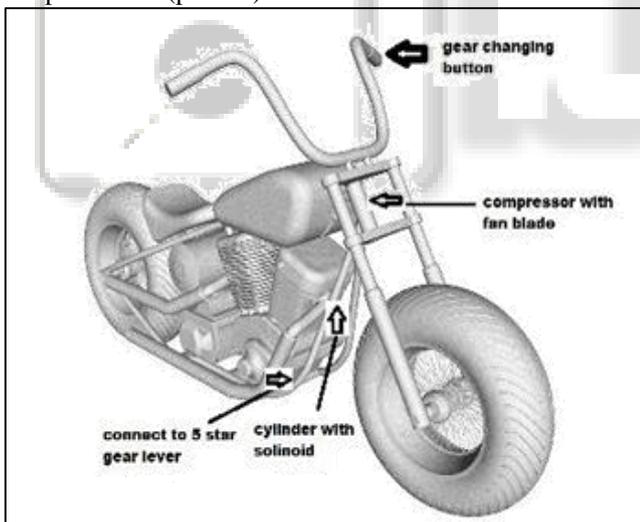


Fig. 5: In Bike View.

#### VI. RESULT

The button introduce left hand side. The thumb finger is used for press the button.

#### VII. CONCLUSION

Just small change enough to introduce this project in bike. And then cost is low. Surely this project change the shifting gear method. And then this project to get new look in bike.

#### REFERENCES

- [1] Brians.Eliot, compressed air operations manual, McGraw Hil Book company, 2006,ISBN0-07-147526-5.
- [2] Hagen.s(2003)"control valve technology"plant services
- [3] Warren rossiter (August 26,2015) "SRAM Red etap ushers in wireless shifting era" Bike radar, retrived 2015-09-12
- [4] Stephen Farrand (oct 25,2010) "Campagnolo show off new electronic gear system" Bike Radar .com. Retrieved 2012-09-10
- [5] Tan, paul,"New 7-speed AMG SPEEDSHIFT MCT DEBUTS "paultan.org. Retrieved 2014-07-18