

Design And Development Of Key Port Operated By Side Stand And Footrest Operated By Switch

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Abstract – While driving two-wheeler vehicle of any kind the consumers look for the safety and convenience the vehicle offers. These two introduced systems are developed by taking the safety and convenience of two-wheeler consumers. Key port operated by side stand system operates on the motion of side stand, when side stand is closed rider is able to insert key and ignite vehicle but when the stand is opened rider is not able to insert key, this is to ensure that rider will close side stand ensuring his safety, especially in rural areas accidents happen due to carelessness of closing side stand properly. The footrest system is simple, footrest are attached to a DC gear motor and a switch is provided at the carriage of vehicle, pillion rider can simply press button to open and close the footrest's, the system is developed to provide convenience.

Key Words: Key port, Side stand, Footrest, Safety, Convenience.

1.INTRODUCTION

In today's world very large amount of people uses two-wheeler vehicle for travelling from one place to another in short period of time. So it is very useful and responsible for minor and major accidents on the road because of forgetting to lift off the side stand. As we know, the side stand plays an important role when the vehicle is in rest condition. By carelessness of lifting off the side stand it may cause bad injuries. Especially in rural areas this causes an increase in rate of accidents, one reason being rash driving, so it is necessary to take preventive action.

In manual side stand there is a possibility that the rider will forget to lift off the side stand causing an unwanted accident situation. So to overcome this possibility we make a project that is to introduce a locking system on the key port of the vehicle. The system works on a simple mechanism and no need to take any power while operating. So it does not affect the vehicle efficiency and can be implemented on any type of two wheeler vehicles. Here we use a shutter lock set and a wire which is connected to the side stand. The wire is connected in the lock set by soldering and to the side stand by black tape. So overall price after installing the system is barely affected. This is a new advancement in two wheeler vehicles by which the rider will have to lift off the stand in any condition. The mechanism is very cheap so we can install it in any two wheeler vehicle.

On the other hand footrest, which is also called as dead pedal, is typically a non-moving component of rubber or plastic that the pillion rider is supposed to rest their foot on.

Foot rest in a two wheeler vehicle is mainly for comfort and convenience of the pillion rider. To overcome the problem associated with the normal way of operating the footrest and to provide convenience to the consumers, we introduce footrest operated by a switch system. The system uses two DC gear motors for rotating the footrest which will be powered by the battery of the vehicle itself. The system is cheap and will have a very small effect on the overall cost of the vehicle.

1.1 Problem statement

We use two wheeler vehicles almost everyday in our daily lives. And thus we face problems on the road resulting in accident scenarios. There are chances of having serious injuries and sometimes even death. Consumer safety and well-being while riding the vehicle is the main focus while designing any system at the same time the comfort and convenience is also a part of the plan. Hence to solve this problem the systems are implemented to minimize the chances of getting into trouble.

1.2 Objective

- To provide safety measures to the rider to avoid unwanted accidents and damage due to side stand.
- To provide comfort and convenience to the pillion rider by giving ease to operate the footrest system.

1.3 Methodology

Locking system on the key port of the vehicle is fitted and connected to the side stand with the help of a wire. The copper wire is connected to the side stand and has been soldered to the lock. When the rider will open the side stand the key port will get closed as the wire will get pulled by the stand. And as the rider will lift off the side stand the lock is free to open and the rider can insert the key and ignite the vehicle. Foot rests are rotated by using a DC gear motor which is powered by the battery of the vehicle and operated by push button. Both the systems are installed on the 'Hero Passion Pro' motorbike.

2. LITERATURE REVIEW

1) Amit Singh, Ankit Kumar Rai, Chandan Yadav, Jayhind Yadav, Prasoon Choudhary, did the work on, Automatic Side Stand of Two Wheeler. According to their work in a country like India, 20-22% of accidents happened due to forgetting the lift off the stand. So the number of accidents due to this reason is serious and many lives have been affected by this reason. In manual side stands there is a possibility that the riders have been forgetting to lift off the stand and it causes an unwanted accident. So to overcome this accident they made a project that is an automatic side stand. Here they propose an idea for an automatic side stand which is completely mechanical and electronic circuit and without using any external power. . This

presented mechanism consists of a D.C motor powered by the motorcycle's battery, connected to the side stand and this motor and battery source is connected to the circuit and microcontroller. When the bike key is ON then a signal is passed to the microcontroller and the motor starts rotating in anti-clockwise direction that causes the stand to lift off. When the stand is fully disengaged it presses the pressure switch which again sends a signal to the microcontroller which stops the motor. They observed that from the design and analysis of the D.C motor and another component like microcontroller and speed sensor, the switch occupies less space and this space is easily available into the mechanical frame of the motorcycle.

2) Malika Gawande, Mahesh Ulhe, Tanay Kewalramani, Suraj Sautkar, Pranit Gawande, Prof. Dr. Tushar Deshmukh did work on, Automatic Side Stand and Footrest Retrieval System, according to their work the automatic side stands work on the simple mechanism and no need to take extra power while operating. So it does not affect the vehicle efficiency and is also suitable for any two-wheeler vehicles. The design of the vehicle is not affected, only a simple mechanism is added to the vehicle. The primary input to this system is given by the user by turning the key to ignition. A key switch is used to take the input from the user. A potentiometer is integrated with a key switch by synchronizing the moment of its variable end with the rotation of the key switch. Hence as the key turns towards ignition state, the resistance that the potentiometer offers is reduced linearly, which results in more current being fed to the arduino nano. An arduino nano board is used as the microcontroller in the system. It is coded such that it senses the amount of current being fed to it as input and gives the output signal to the servo motor such that the amount that the motor rotates is synchronized with the amount of current fed to it. A limit switch is fixed to the spur gear mounted on the motor so when the gear rotates 90 degrees, the lever of the switch comes in contact with the base and the circuit is completed. This limit switch actuates the indication LEDs glued on the panel, when the stand is in ride position, the green LED glows up via the circuit actuated by limit switch.

3) Sanket Jadhav, Siddhesh Bhalekar, Sachin Chavan did the work on, Gear Lock System for Enhancing Safety of Two Wheeler Side Parking Stand, according to their work the side stand is useful for parking the two wheelers on rough surfaces, takes less time and effort, hence it is predominantly used while parking the two wheelers. One of the most common problems encountered while using the two wheelers after parking is the negligence or carelessness to swivel it back to its original position, because of urgency, absence of mind, divergence in concentration etc. Failure to bring back the side stand to its original position may hit the side stand to speed breakers, rough terrains on road and may cause the fatal accident by sudden losing vehicle control. Proposed system integrates the side stand positions with clutch shifter utilizing side stand cable which restricts the gear shifting, ultimately controlling the vehicle movement. The proposed safety system is very simple, robust and economical, since it has side stand cable (clutch cable) only as the main component. Two cables namely clutch cable and side stand cable are connected to the clutch shifter. The side stand cable is connected to the clutch shifter and pivot on the side stand. The clutch cable is connected to the clutch shifter and clutch lever on the handle. For shifting the gear, clutch needs to be disengaged. The tension between the cables plays an important role during the use of safety system. When the side stand is in park ed condition, the side stand cable is in function which pulls the clutch shifter and restricts the disengagement of clutch i.e. gear shifting, ultimately preventing the movement of two wheeler. When the

side stand is in retracted condition, clutch cable is in function which disengages the clutch by operating clutch lever on handle and finally permits the gear shifting i.e. movement of two wheeler. The main purpose of the safety system is to implement a side stand retrieval system with simple mechanisms and easily available components. The authors strongly admit that the developed system is one of the most optimal, and effective solutions for the major problem at minimum resources.

3. METHOD OF IMPLEMENTATION

3.1 Working of Key Port Operated By Side Stand

The shutter lock is mounted on the key port of the bike Passion Pro by screw. The copper wire is connected to the rotating shutter inside the lock body. And the wire is stretched towards the side stand and connected by soldering and is protected by covering it with black tape. When the vehicle is at rest and the side stand is opened the wire will get pulled by the motion of the side stand, and the key port will get locked. The key port of the vehicle will get covered completely by the rotating shutter, this shutter is connected to the half gear inside the body of the lock which rotates the shutter. So for unlocking the key port the shutter must uncover the key port to insert the key. For uncovering the key port we will use the magnetic key slot given on the top of the lock set but for that side stand must get lifted off from the ground. If the side stand remains open then it will not allow the shutter to get to its original position. Hence the rider has no other option than to lift off the side stand otherwise the key will not get inserted into the vehicle. So by this system we are ensuring that the side stand must be closed before starting the vehicle.

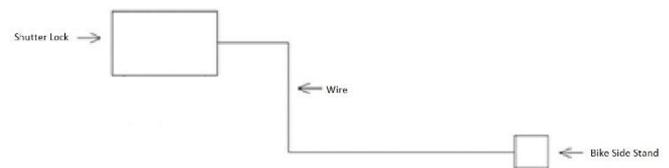


Figure: Key Port Operated By Bike Side Stand

3.2 Working Of Footrest Operated By Switch

The primary input for the footrest system is the battery of the vehicle. From the battery the connection first goes to the push buttons mounted on the rear carriage of the bike. And then connected the DC gear motors on both sides of the bike. The shaft of the gear motor is connected to the footrest which allows the footrest to rotate. The DC gear motors are of 12 volt which is sufficient to rotate the footrest and this requirement is fulfilled by the battery of the bike. As soon as the button is pressed the footrests are moved outside around 90 degrees allowing the pillion rider to r0e0s0t0 0t0h0e0i0r0 feet. The footrests are restricted to rotate more than 90 degrees by the support of the motor system. We have given two push buttons, when the first button (green button) is pushed the footrests are rotated outwards and for the retrieval of the footrests the second button (red button) has to be pushed so that footrests will regain their original position. The life of the battery is not compromised by using this system hence there is no negative effect on the life or efficiency of the battery.

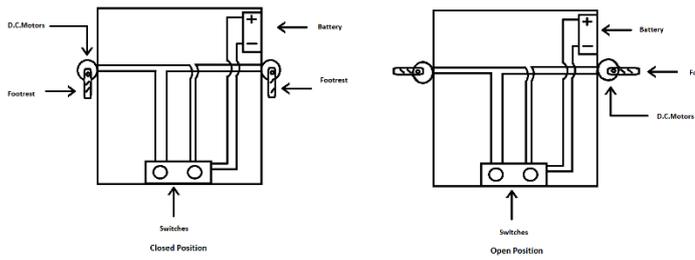


Figure: Working Of Footrest

4. ADVANTAGES

- Very easy in construction and easy installation of the system.
- External power is not required.
- Weight of both the systems is less.
- Both systems are compact in size so it is easy for installation in the bike without any need to change the existing structure of the bike.
- Does not affect the performance of the vehicle in any way.
- Both systems are economical and cost effective.
- Increases the safety measures and convenience of the rider.

5. LIMITATIONS

- In case of failure of vehicle battery the footrest system will stop working.
- In case of copper wire failure the shutter lock will not work, but rider will be able to insert key into vehicle.
- Consumer have to check maintenance of both systems time to time.

6. CONCLUSION

While concluding the final project report, we feel quite fulfilled in having completed the project assignment well on time. We have successfully met the expected outcome of the project. ‘Key Port Operated By Side Stand’ system works efficiently providing the safety for the rider. The system locks the key port while the side stand is not closed and only opens the key port only when the side stand is closed, assuring the safety for the rider. The system minimizes the risk of an accident involved while driving on the road. System uses a shutter lock, copper wire and of course side stand to execute the work. The system takes very less space and is very low in terms of cost.

‘Footrest System Operated By Switch’ system works smoothly providing convenience to the pillion rider. The system uses a pair of motor, push button switch and connecting wires to execute the work. The push buttons are provided on the carriage of the vehicle, by pressing the button pillion rider can open and close the both the footrests. The purpose of this system is to provide convenience to the pillion

rider. The system totally changes the traditional way of opening the footrests to simply pressing a button. Both the introduced systems requires less space and are cost effective for the consumers.

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