Automatic Side Stand

Sayed Fatir Abbas[1], Jadhav Milind[2], Shelke Ajit[3], Khule Yogesh[*]

[*]Assistant Professor, Department of Mechanical Engineering, JCOE Kuran, Maharashtra, India.

[1,2,3,]U.G. Student, Department of Mechanical Engineering, JCOE Kuran, Maharashtra, India.

Abstract- Busy street with speeding vehicles and blaring noise is what a typical image of recent Automobile revolution. With increasing vehicular population, particularly two wheelers which are more vulnerable to accidents, there is increasing demand for the safety of both man and machine. More than 1000 people die every day because of accidents all over the world. One such case, where precaution has to be taken, is the side-stand in two-wheelers. A mere carelessness of not retracting the side-stand can cause huge damage to life and property. This problem provoked us to find an appropriate solution for it. We have decided to generate a safety system to avoid any mishap. The idea of our project is to design a side-stand which prevents starting of the vehicle if the stand is not retracted. The stand is made in contact with a switch and some electrical wiring system of the bike is altered. This could be the most simple and cost effective way to avoid negligence of not pulling up the side stand. The advantage in the design is that it can be used in all types of two wheelers. By applying this technique to motorcycles we can avoid accidents that are caused due to mere human negligence in not retracting the side-stand and provide safety to the rider and his property.

Key words: Automobile, Automatic Side Stand Retrieve System

1. INTRODUCTION

The side-stand is the one intended to be used for parking. It is considerably more stable laterally than a center stand. It takes much more effort to high side a bike (push over to the right) from the left side, side-stand than it is to tip it sideways off of the relatively narrow footing of a center-stand. And it is completely stable to the left against the stand's wide leg, so long as the bike doesn't roll forward. This is why when you take a ferry over rough water they always have you put the bike on the side stand - NEVER on the center-stand. They also sometimes take precautions to keep the bike from rolling forward (chocks) and high siding (strap bike against the side-stand to the left). With the bike in gear, a side-stand is also more stable in the forward direction of the wheels.

If you push forward on the bike, (like when plugging a tire) it is quite possible to push the bike off of either type of stand. For any maintenance that requires applying force from the rear of the bike, the stand should be "locked" into the forward position, like by strapping it to some forward, immovable part of the bike. The center stand (if you have one) is merely a convenience item. It is always there for your use while on the road. It is not intended to be the end-all of stability without taking the appropriate measures. The one place that I do routinely use my center stand for longer term parking of my bikes is in my own garage, where the floor is flat, smooth and level concrete, and I have complete control over the surroundings. Doing so allows me to fit more motorcycles into a given space and to get the bikes' weight up off their tires for longer periods of storage.

1.1 PROBLEM STATEMENT

While the two-wheelers is concerned accidents occurs due to riding the vehicle in high speed, ignores to use helmets, does not maintains the speed limit and forgets to lift the side stand while riding the vehicles. These are the major source for accidents. Forgetting to lift the side stand causes huge accidents in rural areas partly in urban areas too, but accident due to side stand does not have proper preventive measure. If you see the accident status 36% of the accidents occur due to this problem. Some major reasons listed below as,

1. Forget to retrieve side stand.
2. Forget to place bike on side stand.
3. Improper handling of side stands system.
4. Irregular maintenance like faulty spring, worst lubrication.
5. Use of damaged stand. (Bent stand).

1.2 OBJECTIVE

The main objective of our project is to provide a safety measure in bikes to avoid unwanted accidents and damage caused by not lifting off the side stand by providing automated side stand system. Here we propose an idea for automatic side stand which is completely mechanical and electronic circuit and without using any external power. So to reduce the accidents and to improve human safety.

1.3 SCOPE

In future, it will be applicable to all type of vehicle whether it is costly or cheaper bike. In future there is also some advanced modification is possible to like on the basis of the sensor. In this project, we operated mechanism of lifting off the stand and lower it in the very smooth way. So this system definitely has no disadvantages.

2 LITERETURE REVIEW

1. Automatic Side Stand Retrieve System, Sagar Pradip Walhekar, Snehal Balasaheb Bhalerao, Tejaswini Subhash Magdum, Pallavi Machhindra Shinde, Supriya Dnyandev Mankar.

The system “Automatic Side-Stand Retrieve System” is designed based on the working principle of bikes. As all bikes transmit power with the help of chain drive, so this setup is kept in between chain drive. Paper is giving mechanism for side retrieve system. Automatic side stand retrieve system will surely a useful retrieve system. Since the setup is compact it doesn’t affect the performance of the vehicle and power is obtained from chain drive. Definitely this system could be used in all type of bikes for retrieving the side stand, it will be the major system to control accidents due side stand problem and protect the careless rider. These systems can be implemented in all types of bikes by changing small dimensions in size and this system is economical, so it will not affect the economic level also. While compare to other system this Automatic side stand retrieve system will be the life saver.

2. Automated Center Stand, Sarvesh Hinganikar, ShubhamLonkar, Hemant Bisen, Hitesh Panchabhai, Rehab Jaywalk, Asst. Prof. S. R. Bobde.
Most modern scooters come with both a side stand and a centre stand. The side stand is easily deployed allowing the scooter to lean to the left side. The scooter must be hoisted up onto the center stand. This is normally difficult as these stands need to be stepped upon and the vehicle needs to be lifted manually. Unless on firm, leveled ground, the side stand on a scooter or any bike cannot be trusted whose wheels cannot be locked in place by setting a parking brake or leaving it in gear. In this paper, an automated centre stand is designed and fabricated which uses a linear actuator powered by a battery to lower the stand and lift the vehicle and park it on the stand. This stand minimizes human efforts to almost zero. In addition, the self balancing mechanism was firmly established which lifts the scooter upright on uneven surfaces. As a result, it has become possible to install this automated centre stand in mass production scooter. The centre stand of scooter is made automated under the scope of B.E. Mechanical Engineering project. Linear actuator and modified stand are used to make the stand automatically operational. The main advantage of this mechanism is to reduce the human efforts and parking space required while the scooter is parked on side stand.

3. Automatic Bike Stand, Shubham Bagul, Nikhil Dhake, Deepak Mengal, Padmakar Jadhav, Ms.Divya R. Dhagate, Prof. Sunil M.More.
This automation is related to the limit switch. The system uses the two limit switch which is placed two places of stand. When the limit switch is actuated the stand will automatically placed. If another limit switch is actuated the side stand will automatically returns to the initial position. When limit switch is actuated the signal is passed to the micro controller from the limit switch. The micro controller saves
the data and actuates the relay. This relay is used to actuate the motor. Thus by the stand is placed. If another limit switch is operated this sends the signal to the micro controller. So this actuates the relay thus the motor is operated and the stand is return to the initial position. This automation is very useful at the time of parking. This is the simplest method and can be suitable for all automobile two wheeler vehicle.
In this project, a novel method of automatic bike stand is been designed and developed for motorcycle bike drivers. As everyone in today's world is riding bike it is essential to take care of unwanted troubles. Each and every bike should have automatic bike stand.

3 COMPONENTS

In this chapter we are going to describe the components and systems used for making the project along with general information of each component.

3.1 Electric Battery

An electric battery is a device consisting of one or more electrochemical cells with external connections provided to power electrical devices such as flashlights, smart phones, and electric cars. When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode. The terminal marked negative is the source of electrons that will flow through an external electric circuit to the positive terminal. When a battery is connected to an external electric load, a redox reaction converts high-energy reactants to lower-energy products, and the free-energy difference is delivered to the external circuit as electrical energy. Historically the term "battery" specifically referred to a device composed of multiple cells, however the usage has evolved to include devices composed of a single cell.

Fig 3.1 Electric Battery

3.2 DC motor

DC motors are electric motors that are powered by direct current (DC), such as from a battery or DC power supply. Their commutation can be brushed or brushless. The speed of a brushed DC motor can be controlled by changing the voltage alone. By contrast, an AC motor is powered by alternating current (AC) which is defined by both a voltage and a frequency. Consequently, motors that are powered by AC require a change in frequency to change speed, involving more complex and costly speed control. This makes DC motors better suited for equipment ranging from 12VDC systems in automobiles to conveyor motors, both which require fine speed control for a range of speeds above and below the rated speeds.
When selecting DC motors, buyers need to identify the key performance specifications, determine design and size requirements, and consider the environmental requirements of their application.

Fig 3.2 DC motor

3.3 Worm gear drive

A worm gear is a gear consisting of a shaft with a spiral thread that engages with and drives a toothed wheel. Worm gears are an old style of gear, and a version of one of the six simple machines. Basically, a worm gear is a screw butted up against what looks like a standard spur gear with slightly angled and curved teeth. It changes the rotational movement by 90 degrees, and the plane of movement also changes due to the position of the worm on the worm wheel (or simply "the wheel"). They are typically comprised of a steel worm and a brass wheel. An electric motor or engine applies rotational power via to the worm. The worm rotates against the wheel, and the screw face pushes on the teeth of the wheel. The wheel is pushed against the load.
There are a few reasons why one would choose a worm gear over a standard gear.

The first one is the high reduction ratio. A worm gear can have a massive reduction ratio with little effort - all one must do is add circumference to the wheel.

A second reason to use a worm gear is the inability to reverse the direction of power. Because of the friction between the worm and the wheel, it is virtually impossible for a wheel with force applied to it to start the worm moving.

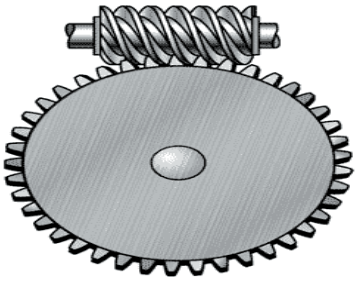

Fig 3.3 worm drive

3.4 Side stand

A kickstand is a device on a bicycle or motorcycle that allows the bike to be kept upright without leaning against another object or the aid of a person. A kickstand is usually a piece of metal that flips down from the frame and makes contact with the ground. It is generally located in the middle of the bike or towards the rear. Some touring bicycles have two: one at the rear, and a second in the front.

A side stand style kickstand is a single leg that simply flips out to one side, usually the left side, and the bike then leans against it. Side stands can be mounted to the chain stays right behind the bottom bracket or to a chain and seat stay near the rear hub. Side stands mounted right behind the bottom bracket can be bolted on, either clamping the chain stays, or to the bracket between them, or welded into place as an integral part of the frame.

Fig 3.4 Side stand

3.5 Pedstel bearing

A pillow block usually refers to a housing with an included anti-friction bearing. A pillow block refers to any mounted bearing wherein the mounted shaft is in a parallel plane to the mounting surface, and perpendicular to the center line of the mounting holes, as contrasted with various types of flange blocks or flange units. A pillow block may contain a bearing with one of several types of rolling elements, including ball, cylindrical roller, spherical roller, tapered roller, or metallic or synthetic bushing. The type of rolling element defines the type of pillow block. These differ from "plumber blocks" which are bearing housings supplied without any bearings and are usually meant for higher load ratings and a separately installed bearing.

The fundamental application of both types is the same, which is to mount a bearing safely enabling its outer ring to be stationary while allowing rotation of the inner ring. The housing is bolted to a foundation through the holes in the base. Bearing housings may be either split type or solid type. Split type housings are usually two-piece housings where the cap and base may be detached, while others may be single-piece housings. Various sealing arrangements may be provided to prevent dust and other contaminants from entering the housing. Thus the housing provides a clean environment for the environmentally sensitive bearing to rotate free from contaminants while also retaining lubrication, either oil or grease, hence increasing its performance and duty cycle.

Fig 3.5 Pedstel bearing

4 ADVANTAGES OF THE PROJECT

- No human interference, so less chances of damage.
- No need to operate side stand by legs, side stand can be operated on switches.
- It does not affect the engine efficiency.
- It does not affect the structure of a vehicle.
- It is easily fitted in the vehicle.
- Less chances of accidents than the existing system.

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