

# AUTOMATIC SIDESTAND RETRIEVE SYSTEM

G.kedarnath<sup>1</sup>, Rajesh kumar sahu<sup>2</sup>, M.saichandu<sup>3</sup>, S.Harish<sup>4</sup>

<sup>1</sup> Asst.professor,mechanical engineering, Kprit, Telengana, India

<sup>2</sup> Student, mechanical engineering, Kprit, Telengana, India

<sup>3</sup> Student, mechanical engineering, Kprit, Telengana, India

<sup>4</sup> Student, mechanical engineering, Kprit, Telengana, India

## ABSTRACT

*In modern developing world, automobile plays vital role especially two-wheeler i.e. (motorcycles & bikes) plays a major role. Though they are helpful there are some sad events like accidents occur due to careless of rider. Major accidents occur due to forgetting of lifting side stand. To rectify this problem many advance measures have taken. by considering this problem we want to implement practically the new system "AUTOMATIC SIDE STAND RETRIEVE SYSTEM IN TWO WHEELER" is designed based on the working principle of bikes. Since all bikes transmit power from engine to rear wheel by means of chain drive. So that designed setup is kept in between chain drive, setup rotates and side stand get retrieves automatically.*

**Keyword :** - Chain drive, Sidestand, Retrieve, and Sprocket etc....

## 1. INTRODUCTION

In modern era the living status were developed .Everyone depending upon two wheelers to travel from one place to another palce. But due to human beings negligence they forgetting to lift side stand .due to this reason they facing accidents .To avoid those problems we came up with a idea by adopting "Mechanical side stand retrieve system" we can reduce accidents up to some extent.

### 1.1 Sources of accidents

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, because all the other source of accident has preventive measure, but accident due to side stand do not have proper preventive measure. If you see the accident status 36% of the accidents occur due to this problem

### 1.2 Proposed method

Based on the working principle of two-wheeler (i.e. the power is generated in the engine and it transmits power to the pinion and makes it to rotate. The pinion transmits power to the rear wheel pinion and makes the vehicle to move). This is the basic principle followed in all type of two-wheelers, based on this "sprocket-side stand retrieve system" is designed because this system works by getting power from chain drive. This sprocket system consists of four components, which is assembled as two set up which would be explained briefly in construction and working part of this paper

## 2. CONSTRUCTION AND COMPONENTS

### 2.1 Construction

The whole construction of this system is simple and efficient. The arrangement and position of components makes the system to function. Each and every component has its own property and responsibility. The power obtained from the chain drive is transmitted to the appropriate component without power loss. The systematic design

of system is made in order to consume only very low amount of power initially for few seconds to retrieve the stand. Then the power consumption does not occur after retrieving the stand. Construction of the proposed “**Automatic side stand retrieve system**” consists of four major components.

### 2.1.1 Components and its design

- Axle
- Sprocket pinion
- Lifting lever
- Pushing lever
- Spring

### 2.1.2 Axle:

Axle is the metallic rod made up of mild steel. It connects the lifting lever and sprocket centrally. The axle is welded centrally to the sprocket. The axle is hold by a holder. The holder is welded with the frame. The holder is used to prevent vibration and to provide support to the axle. The holder has small metallic tube and a rectangular metal plate. The metal plate is welded perpendicular to the tube. The diameter of tube is slightly greater than the axle diameter about 2 to 4mm. This is for allowing the axle to rotate freely without friction with the tube. The other end of the metal plate is welded at the frame. The whole metallic members of holder are of mild steel.



**Fig no -1:** Axle

The one end of axle is welded with sprocket and other end with lifting lever and thus the power is transmitted from sprocket to lifting lever.

**Table -1: Specification of the axle**

S.NO	CONTENT	SPECIFICATIONS
1	MATERIAL	Mild Steel
2	SHAPE	Cylindrical rod
3	LENGTH	50mm
4	DIAMETER	13mm
5	INNER DIAMETER OF SUPPORTING AXLE	15 mm
6	OUTER DIAMETER OF SUPPORTING AXLE	17mm
7	LENGTH	30mm
8	THICKNESS	3mm

### 2.1.3 Sprocket pinion:

Sprocket is the major component of this system because it is power transmitting device. It gets power from the chain drive and makes this system to work. It is the device which transmits the linear motion of meshing chain drive into rotary motion by means of the tooth found on it. The sprocket with ball bearings is said to be FREE WHEEL.



Fig 2 Sprocket with bearing

Since it is a free wheel it allows the toothed part to rotate free from central portion in a direction. Hence this type of sprocket is used as the rear power transmission device in by cycle that makes the wheel to rotate and also allows toothed area to rotate in anticlockwise when pedaled anticlockwise direction. This action of sprocket allows attached lifting lever to adjust freely automatically or manually when it does not engages with pushing lever properly.

Since the sprocket transmits the power from chain drive, it should have the capability to withstand the heavy loads of engine. So to withstand those impacts on toothed area, It is made of high carbon steel. The ball bearings are made up of high chromium steel. Hence all these material gives following properties for sprocket.

- ❖ Heavy duty
- ❖ Smooth running
- ❖ Tempered
- ❖ Long life

Hence the sprocket is considered as heart of this system

Table -2: Specification of the sprocket

S.NO	MATERIAL	High Carbon Steel
1	PITCH	12.7mm
2	WIDTH	30mm
3	TEETH	16
4	BALLS	High carbon high chromium steel balls

#### 2.1.4 Lifting lever:

Lifting lever is the third major component of the system .the lifting lever is the rectangular rod made of ms-rod, which consists of two lifting leaves which is mounted with the edge of axle. The lifting leaves should be parallel to the sprocket pinion. The lifting lever is composed of two metal rods, where both are welded at either sides of the axle. The free ends of the lifting leaves are tapered well. The ends are machined well for tapered shape for smooth engaging with pushing lever.This smooth engagement leads proper retrieving of side-stand. This tapered surface makes the lifting lever as capable to withstand engine impact. When stand is moved vertical in position, the pushing lever engages with lifting leaves. This may not possible in all time, since the angle of lifting lever may be any degree. So due to effect of free wheel and tapered surface of the lifting lever can adjust itself.

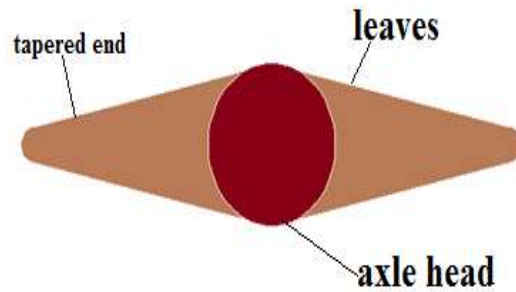


Fig 3 Lifting lever

Table -3: Specification of the Lifting lever

1	LENGTH OF LEVER	95mm
2	THICKNESS	5 mm
3	POSITION	Parallel to Sprocket
4	WELDED LENGTH	13mm
5	MATERIAL USED	Mild Steel

**2.1.5 Pushing lever**

Pushing lever is the component pivoted centrally to the side stand. The pushing lever is metallic rectangular plate, whose bottom end is bended in shape of C and top end is welded with a small piece of rectangular rod. This small piece of rod is used for getting lifted by the lifting lever. Since this rod engages (or) lays over tapered edge of lifting lever, thus the retrieving occurs smoothly. The pushing lever is made of ms-flat rod with the length according to the distance of side stand arrangement. Its top end is made tapered so as to engage with lifting lever. The bottom end of the lever is made as C-clamp, which holds the side stand as shown in fig



Fig 3 pushing lever

Table -4: Specification of the pushing lever

MATERIAL	Mild Steel
LENGTH OF LEVER	450mm
THICKNESS	3mm
LENGTH	30mm
THICKNESS	3mm

DIAMETER OF CLAMP	28mm
DIAMETER OF STAND	25mm
BOLT DIAMETER	8mm

### 2.1.6 Spring:

A **coil spring**, also known as a helical spring, is a mechanical device which is typically used to store energy and subsequently release it, to absorb shock, or to maintain a force between contacting surfaces. They are made of an elastic material formed into the shape of a helix which returns to its natural length when unloaded.

Table -5: Specification of the Spring

NO.OF COIL	23
DIAMETER OF COIL	2mm
DIAMETER OF WIRE	15mm
INNER DIAMETER OF COIL	12mm
MEAN COIL DIAMETER	13.5mm
TYPE	Closed coil helical spring
EXTENSION LENGTH	17mm*2=34mm
MATERIAL	Stainless Steel

## ASSEMBLING AND ARRANGEMENT

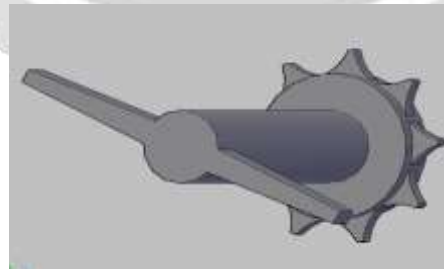
### 3. Assembly of component:

For the functioning of system the above four components are arranged in two assembly which is described below,

- 1.Inciter assembly
- 2.Retriever assembly

#### 3.1. INCITER ASSEMBLY:

Inciter assembly consists of axle, sprocket and lifting lever. The Sprocket is mounted on the centre of the axle and the lifting lever is welded at the front side of axle as shown in fig 4



This inciter assembly is main assembly because it receives the power from the chain and incites the retriever assembly to retrieve the side stand because this inciter assembly is kept under the chain as such that the sprocket attached centrally with the axle get engage with chain drive.

#### 3.2. Retriever Assembly:

Retriever assembly consists of pushing lever and side stand. The pushing lever is centrally pivoted with the side stand as the pushing lever's tapered end is at the top side and clamp is at the bottom as shown in fig 5. Side stand of the bike is drilled at the centre as to pivot the pushing lever as shown in figure 4.2. Pushing lever is also drilled at the center as such the both components kept together and bolted as such that C shaped clamp is at the bottom and flat rod is kept at the top side.

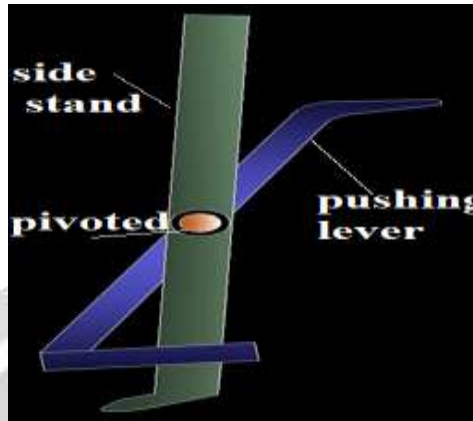


Fig 5 Retriever assembly

## 4. WORKING

### 4.1 WORKING PRINCIPLE

Sprocket side stand retrieve system retrieves the side stand automatically if the rider forgets to lift the side stand while moving the bike. It works based on the working principle of the two-wheelers. Every bike transmits power from engine's pinion to the rear wheel i.e. rotary motion of the pinion makes the linear motion of the chain. That linear motion of the chain is absorbed by rear wheel's sprocket and converted into rotary motion. That rotary motion of the rear wheel makes the bikes to move. Based on this Sprocket side stand retrieve system is designed.

If Sprocket is kept between the chain drive, it makes the sprocket to rotate so, using the sprocket as the major component this system works. It gains the power from the chain and makes a specially designed component (lifting lever) to rotate. This rotation incites engaged pushing lever to push the side stand to retrieve. When chain rotates anti-clockwise direction the inciter assemblies' sprocket absorbs the power and rotates in clockwise direction. The working of "Sprocket-Side Stand Retrieve System is explained below in both (resting & riding condition of two-wheeler). The power transmission to retrieve side stand as shown below

ENGINE – CHAIN - SPROCKET- AXLE- LIFTING LEVER- PUSHING LEVER-SIDE STAND

#### 4.1.1 RESTING CONDITION:

When two-wheeler is in resting condition i.e. when rider actuates the side stand of the vehicle to ground, the pushing lever that is pivoted at the centre of the side stand gets engaged with the inciter assemblies' lifting lever. During this condition the inciter assembly is at rest and retriever assembly (pushing lever's tapered end gets engaged with tapered end of lifting Lever). Pushing lever's length can be changed according to type of bikes and distance calculated between the side stand and chain drive. Closed coil helical spring which gets pulled, the coil of spring gets tensed during stand resting in ground. This is the condition of system during resting stage.

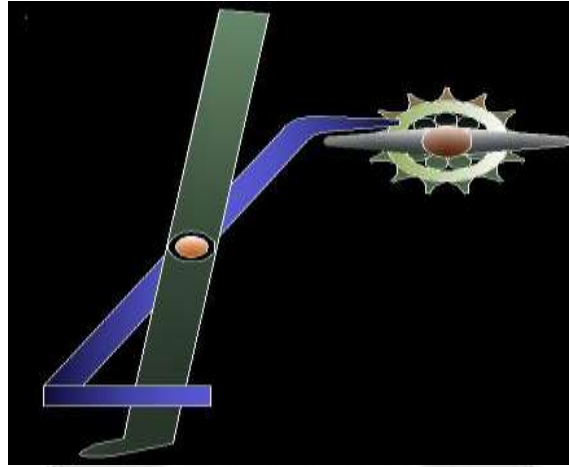


Fig 6 Resting condition

#### 4.1.2 RIDING CONDITION:

When two-wheeler is started, Engine's pinion transmits power to the rear wheel by the chain drive. The inciter assembly which is kept at the center of the chain drive gets rotates as the sprocket gets engage with chain drive. So, when the sprocket rotates the lifting lever mounted with axle rotates. Hence the lifting lever lifts engaged the pushing lever and therefore the pushing lever pushes the side stand by clamping it with the C shaped clamp stand holder and hence the spring tensed in the side stand get compressed quickly as a result side stand get retrieves

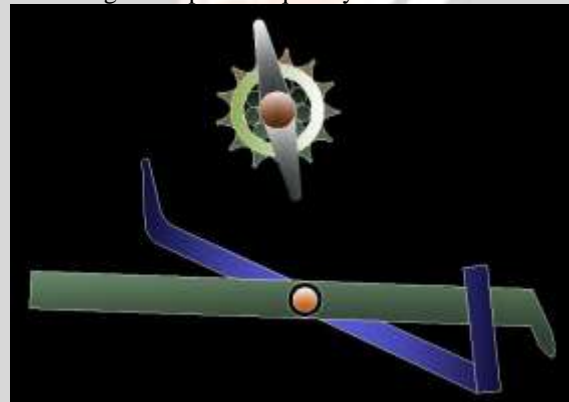


Fig-7 Idle condition

#### 5. Advantages:

- This system can be implemented in all types of bikes by changing small variation.
- Size and cost of system also very low.
- Doesnot effect performance of the vehicle.
- It will be the life saver

#### 6. CONCLUSIONS :

“Sprocket- side stand retrieve system” is definitely good retrieve system because the setup is compact and it does not affect the performance of the vehicle. The power is obtained from chain drive. Definitely this system could be used in all type of two-wheelers (TVs-XL, all front, back, hand geared) for retrieving the side stand, it will be the major system to control accidents due side stand problem and protect the careless rider. This system can be implemented in all types of bikes by changing small variation in size and cost of this system also very low and so it will not affect the economic level also. While compare to other system this SPROCKET SIDE STAND RETRIEVE SYSTEM will be the life saver

#### 7. REFERENCES :

- [1]. Two wheeler manual of LML freedom
- [2]. Theory of machine by SS RATAN
- [3]. Machine design by BHANDARI
- [4]. [www.bajajauto.com](http://www.bajajauto.com)
- [5] [www.heromotocorp.com](http://www.heromotocorp.com)
- [6] [www.designtools.com](http://www.designtools.com)

