Sprocket Side- Stand Retrieve System

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***Abstract*: In modern developing world, automobile plays important role especially two-wheeler i.e. (motorcycles& bikes) plays a major role. Even though they are helpful there are some sad events like accidents due to careless of rider. Major accidents occur due to forgetting of lifting side stand. To rectify this problem many advance measure have taken, but they are useless. So, by considering that it should be implemented practically in all types' bikes .the new system "SPROCKET SIDE-STAND RETRIEVE SYSTEM" is designed based on the working principle of bikes. Since all bikes transmit power from engine to rear wheel by means of chain drive. Since designed setup is kept in between chain drive, setup rotates and side stand get retrieves automatically.**

Keywords—sprocket, engine, clutch, gear, bearing.

1. INTRODUCTION

1.1 Introduction to the Auto Mobile

In modern world the living status were developed and developing more equipped. The automobile takes a great part in the development, since it plays one of a major key in daily life. While automobile is concern two-wheeler i.e.(motorcycles and bike) it plays very important role because it saves the time of traveler by reaching the target place very faster. Although it saves the time it does not safe the life of rider if rider is careless, there are some sad facts on them such as accidents.

1.2 Source for 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.

Table 1.1 Detail reasons for accident

S.No	During The Year	Reason For The Accident	%Of Accidents
1.	2002-2008	Forgetting to lift side-stand	36%
2.	2002-2008	Does not maintain speed limit	38%
3.	2002-2008	Does not obey traffic rules	22%
4.	2002-2008	Other problems	04%

1.3 Existing Methods

To prevent accidents occur due this side-stand many ECU and mechanical project had been found.

1.3.1 Modern ECU:

In order to reduce accidents due to carelessness in lifting the side-stand, many advance measures have been introduced like ECU; the modern ECU contains a 32 bit and 40 MHz processor. It will be fast as pc's microprocessor. The ECU decides timing and functioning of engine and its parts. This play its role in dashboard, this indicates the gear shifting, side stand, to wear helmet in digital display E.g., Hero Honda's Karizma ZMR. But the people ignore to listen those indicators and safety rules. so for safe guard many mechanical projects have been found to retrieve the side stand automatically.

1.3.2. Mechanical Project

In existing mechanical project many ideas had been found to lift the side-stand automatically.

i) One small flat rod is kept attached and pivoted between the gear actuator lever and the side stand of the bike. When the gear is actuated the side stand gets lifted automatically.

ii) Small stepper motor is connected between the side stand and the engine ,when engine is started the stepper motor gains the source of power and retrieve side stand automatically

These are some methods to retrieve side stand automatically when the vehicle moves but it is not implemented in practical use due to its drawback.

1.4 Drawback of Existing Methods

ECU methods are implemented only in costlier bikes but it does not implemented in normal domestic bikes due to their cost.

When we come across those mechanical projects we could note some drawbacks like wear out of gears, making injuries in legs while actuating gears. Major drawback is it cannot use in all type of two-wheelers. So, in order to solve this we thought and designed "SPROCKET-SIDE STAND RETRIEVE SYSTEM" this system can be attached in all type of two-wheelers (mopeds, geared, non-geared, hand geared bikes).

1.5 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 "sprocket side stand retrieve system" consists of four major components. They are

2.1.1components&Its Design:

- Axle
- Sprocket pinion
- Lifting lever
- pushing lever

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.

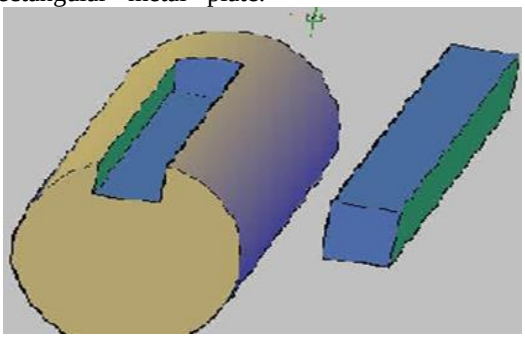


Fig 2.1 axle with key way

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. 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.

2.1.3sprocket 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.

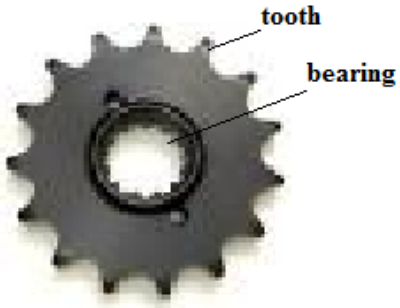


Fig 2.2 Sprocket with bearing

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.

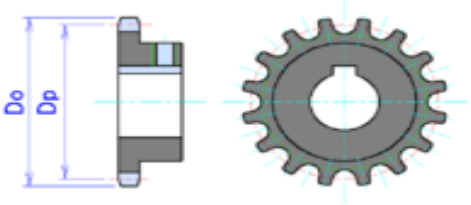


Fig 2.3 Sprocket with nomenclature

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

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.

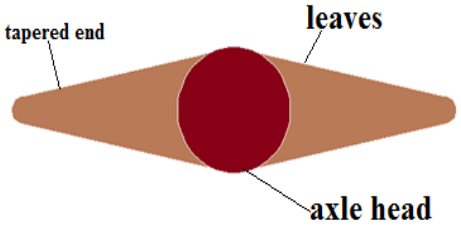


Fig 2.4 Lifting lever

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.

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.

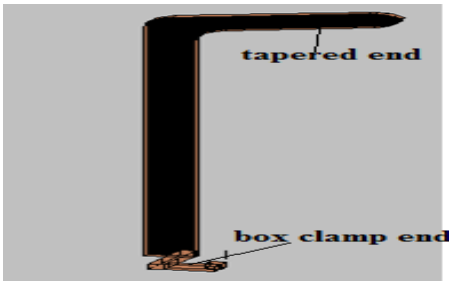


Fig 2.5 Pushing lever

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 fig2.5

These are four major components using in this system and other small components like Nuts and bolts, hooks etc., and are used in this system. Specification and dimension of the component is described in chapter 3.

3 SPECIFICATION OF COMPONENTS

3.1 Specification of Sprocket

Table 3.1

Material	High Carbon Steel
Pitch	12.7mm
Width	30mm
Teeth	16
Balls	High carbon high chromium steel balls

3.2 *Specification of Axle*

Table 3.2

Material	Mild Steel
Shape	Cylindrical rod
Length	50mm
Diameter	13mm
Inner Dia. of Supporting Axle	15 mm
Outer Dia. Of Supporting Axle	17mm
Length	30mm
Thickness	3mm

3.3 *Specification of Lifting Lever*

Table 3.3

Length Of Lever	95mm
Thickness	10mm
Tapered Angle	45deg
Chamfered Angle	20deg
Position	Parallel to Sprocket
Welded Length	13mm
Material Used	Mild Steel

3.4 Specification of Pushing Lever

Table 3.4

Material	Mild Steel
Length Of Lever	180mm
Thickness	3mm
Diameter Of Hole	8mm
Length	30mm
Thickness	10mm
Diameter Of Clamp	28mm
Diameter Of Stand	25mm
Pivoted Angle	55deg
Bolt Diameter	8mm

3.5 Specification of spring

Table 3.5

No. Of Coil	32
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

4. ASSEMBLING AND ARRANGEMENT

4. Assembly of Components

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

- Inciter assembly
- Retriever assembly

4.1. 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 4.1

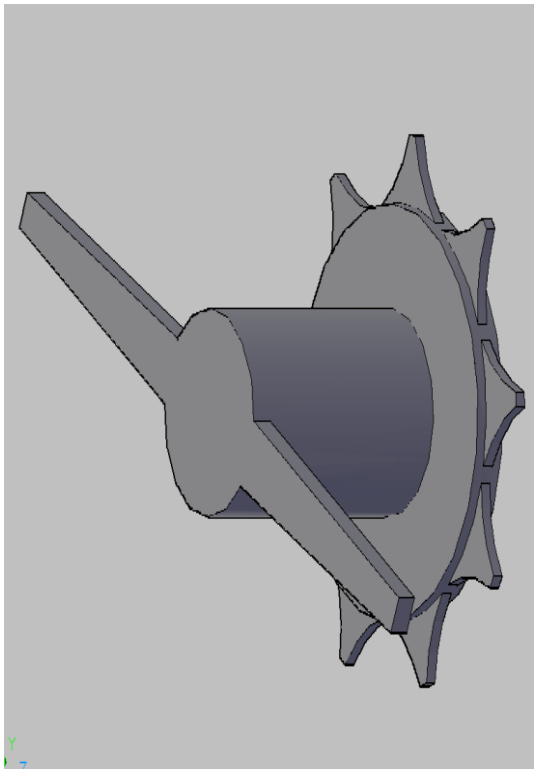
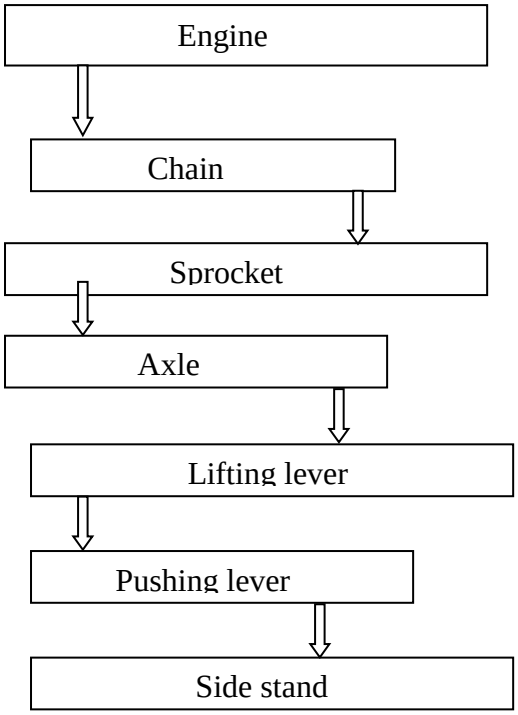


Fig 4.1 Inciter assembly

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.

5. POWER SOURCE

This chapter deals with the power source of the working component and how the each component and assembly of component works is explained below with flow chart.



Flow chart 5.1 Power source of component

6. WORKING

6.1 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 bikes transmit 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 make the sprocket to rotate so, using the sprocket as the major component this system works. It gains the power from the chain and make 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)

6.1.1 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 engage with the inciter assemblies lifting lever. During this condition the inciter assembly is at rest and

retriever assembly (pushing lever's tapered end get engage with tapered end of lifting Lever).

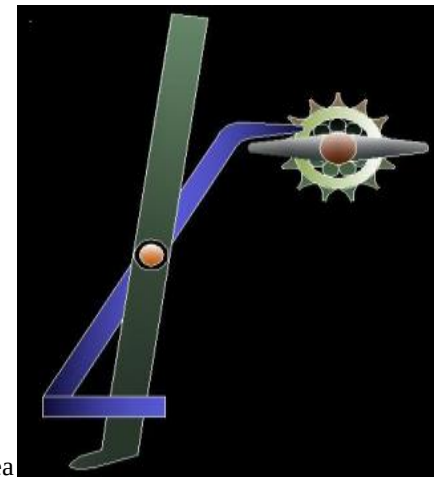


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Fig 6.1 Resting condition

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.

6.1.2 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

6.2 Side View

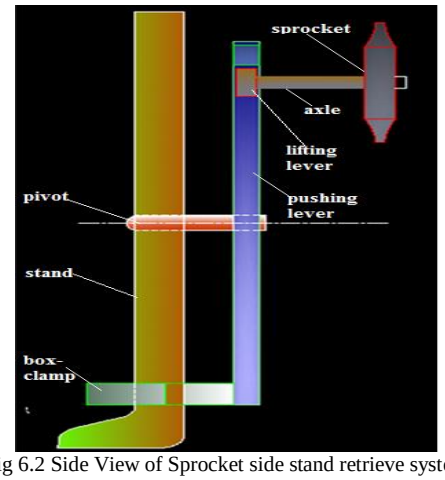

Fig 6.2 Side View of Sprocket side stand retrieve system

7. CONCLUSION

"Sprocket- side stand retrieve system" will definitely good retrieve system. Since the setup is compact it does not affect the performance of the vehicle. Because of 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.

Fig 7.1 Front View of Inciter Assembly

Fig 7.2 Retrieved Conditions

Fig 7.3 Side View of Model

Fig 7.4 Top View of Model

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