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Design and Development of Chain Lock Mechanism Using SideStand System

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ABSTRACT

In modern developing world, automatic plays important role especially two-wheeler i.e., (motorcycle and 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 as a by considering that it should be implemented practically in all types bikes the new system "SPROCKET SIDE STAND RETRIEVE SYSTEM" this system can be attached in all type of two-wheeler (mopeds, geared, non-geared, hand geared bikes) and it is designed based on the working principal of bikes. the percentage of two-wheeler motorcycle accidents increased due t/o the ignorance of the driver. Mostly the ignorance is observed in not removing the side stand before starting the two-wheeler motorcycle. The present study deals with the development of

the side stand retrieval mechanism for a two-wheeler motorcycle to avoid accidents. The present study deals with the utilization of the chain sprocket mechanism with the attachment of the arm to retrieve the stand. The developed product will help to retrieve the stand automatically before the two-wheeler come into the motion.

- Key Words: Side stand , mechanism , Accident reduction , Two-wheeler vehicle. Chain Lock .

1) INTRODUCTION.

In modem 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 traveller by reaching the target place very faster Motorcycles are generally provided with stand for supporting the motorcycles when they are not in use. A motorcycle side stand is a nearly universal method of allowing a motorcycle rider to park his vehicle unattended easily. If this stand is in the park position while the motorcycle is ridden through left turn a serious safety hazard exits. A new type side stand which is automatically retracting side stand is invented to prevent such type of accidents. According to a sales survey conducted by Statist [1], the sales of two-wheelers for the fiscal year 2017-18 were around 20 million units for the top six OEMs and is expected to grow surpassing China to claim the first position in two-wheeler sales. Still, the rates of accidents caused by these vehicles are significant. The road accidents for different types of vehicles observed in the year 2016 is shown in The number of non-fatal accidents injured about 1,53,060 people in 2016, and the major reason for such kinds of accidents is carelessness while riding the vehicle, which includes forgetting to retrieve the side stand or not following the safety regulations [2] The problem may be small, but a considerable amount of accidents are caused due to these reasons. In India, about 22 % of accidents were observed to be occurred due to ignorance in lifting the side stand.

2) LITERATURE REVIEW.

Gowtham et al.[3] proposed the system which automatically retrieves the stand by using chain drive, whereas the device was proposed by Muralidharan et al. [4] to raise the stand while running of the motorcycle. Similarly, the separate attachment had been provided for the lifting of the stand automatically [5, 6, 7]. The side stand retrieval system was developed by using sprocket [8, 9] and spring [10], which can help to reduce the accidents. The design and fabrication of the automatic side-stand retrieval system were carried out by a few authors. The designed setup was mounted between the chain drive, which rotates and helps to automatic retrieval of stand [11, 12]. Few designs were fabricated, which operates totally by means of manual feet power of the rider. Along with the design, few authors had also carried out the analysis of side stand mechanism using finite element software [13, 14]. Elimination of such kinds of accidents can be

achieved by introducing additional safety devices to the vehicles, which will not only enhance the riding quality but also acts as a safeguarding device for the rider. This can be achieved by implementing the mechanism for retrieving side stand, which consists of minimum addition of components in an already existing transmission system of a two-wheeler.

3) MATERIAL.

The components used in the development of the mechanism are of different materials as per their functionality. The major elements utilized in the mechanism are shown in Table 1 with their respective material

Sr. No	Components	Materials
1	Rear wheel sprocket	Low Carbon Steel
2	Final drive sprocket	Low Carbon Steel
3	Chain	Alloy Steel
4	Lifting and sprocket lever	Mild Steel

Table -1: Elements in the proposed mechanism with their material.

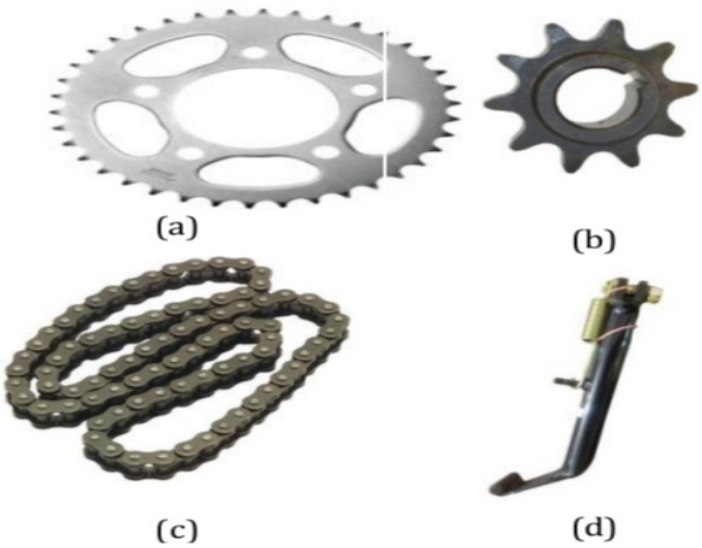

Fig -1: Elements in the proposed mechanism, (a) rear wheel

sprocket, (b) final drive sprocket, (c) chain, (d) side stand.

4) PROPOSED METHOD.

Based on the working principal 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 principal 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. The transmission train commonly adapted for Indian two-wheelers consists of different elements, as The final driving sprocket at the end of gearbox generally transmits the drive from the gearbox to the rear wheel sprocket mounted on the rear wheels of a two-wheeler through an overrunning chain. The proposed mechanism utilizes the components available in the secondary drive system of power transmission train, which includes rear wheel sprocket, final drive sprocket, chain, and side-stand as Along with these components, the transmission train consists of levers, and the extra drive sprocket.

5) CONSTRUCTION & WORKING PRINCIPLE.

5.1) 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 s 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 dose not occurs after retrieving the stand.

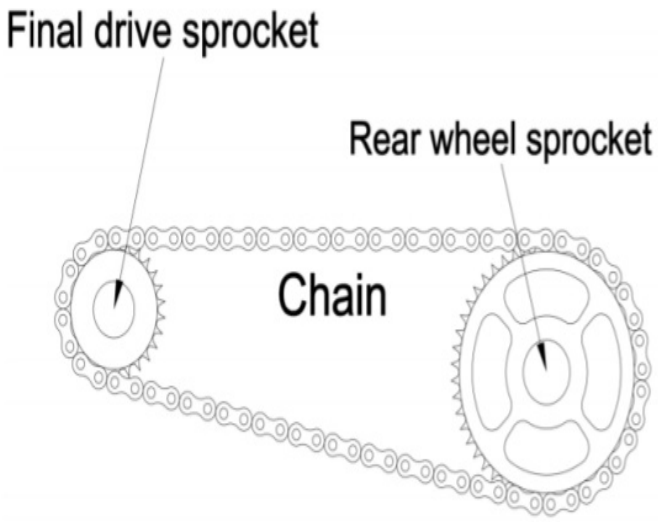

Fig -2: Transmission mechanism in two-wheeler vehicle.

5.2) WORKING PRINCIPAL.

In Automatic side stand retrieve system, the side stand automatically gets retrieved if the rider forget to lift the side stand while moving the bike. It's working is based on the working principle of the two-wheelers. In motor bike power is transmitted 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 side stand retrieve system is designed. If Sprocket is kept between the chain drive, it make the sprocket to rotate. The working of this system is based on the sprocket. 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 in anti-clockwise direction the inciter assembly's sprocket absorbs the power and rotates in clockwise direction.

Fig- 3 : Proposed model of the side stands retrieval mechanism.

6) RESULT.

The constructional feature for the proposed mechanism includes a sprocket situated in the transmission train in between the final drive sprocket and rear wheel sprocket along with a lever mounted on the periphery of the sprocket. Similarly, a lever welded on the side stand act as lifting lever, as shown in Fig. 3. When the vehicle is in the parked condition, the lever welded to the side stand rests over the sprocket lever. This condition will prevail whenever the vehicle is rested on the side stand. When the vehicle is to be set in motion, the elements of the transmission train will receive the power along with the sprocket set in between the driving and driven sprocket. The rotation of the sprocket will cause the lever to push the side stand lever in an upward direction, and the rest of the work required to retrieve the side stand is done by the spring tension present in the side stand. As the stand gets retrieved, the contact between both the levers gets diminished. The experimental setup of the proposed mechanism is observed to be fulfilling the requirement of retrieval of the side stand. The limitations which were observed while constructing the mechanism can be overcome by further development. The position of the sprocket in the chain is a convoluted part that has to be handled properly with a mathematical approach as

the position of the sprocket will determine the length of the side stand to lift lever which has to be minimum as possible to fitting available spacepersons the vehicle. The placement of the sprocket in the proposed mechanism is on the fame itself, which provides it sturdy support, but while considering a two-wheeler, such space is difficult to identify. Thus the construction of the extra frame feature in the vehicle needs the support of the sprocket

7) ADVANTEGES.

1. Easy in installation.

2. Simple in mechanism.

3. No extra power source required.

4. Smooth running.

5. Low in cast.

8) APPLICATION.

Used in all type of two wheelers, geared, non geared, hand gears.

9) CONCLUSION & FUTURE WORK.

“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.

10) REFERENCE.

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