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Automatic Mechanical Bike Stand

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Abstract - The era is of automatic systems but still some machines have manual system like the gate of vehicle, stand of bikes. Sometimes bike opened bike stand may be very dangerous to rider while turning, the bike may jump on stand causing heavy injury. So it is required to make the stand close during bike riding. The bike is of only two wheels hence during turning it make a short turning radius by leaning from its axis either right side or left side depending on turn. If bike stand remained open, during left turn it may throw the bike to opposite direction i.e. right side which may cause serious accident. For all these purposes the bike stand should be automatically closed during bike motion.

Key Words: Era of Automatic System, Bike Stand Turning Radius, Remained open, Throw,

1. INTRODUCTION

The Automatic Mechanical Bike Stand is about a stand of bike which will close automatically after bike movement by a mechanical arrangement. A bike Automatic Mechanical Bike System is more safe and convenient. However an electrical system can be used in place of mechanical system but that will require a power supply as well as have more chances of failure during operation. But a mechanical system is more stable and durable and have longer life. Electrical system will consist of an electromagnet which have high cost but mechanical system does not have any such costly requirements.

1.1. Literature Survey

Bike is a two wheeler vehicle which keep in straight position during motion but when motion stops it fell down due to gravity. After the felling there may be a damage in bike as well as it requires more force to stand again in straight position. Hence a stand is required to be attached to make the bike straight in rest position. These days bikes have stands which is opened and closed manually by rider. If the rider forgets to close the stand it remains open during motion which is dangerous to rider. As the bike during motion may jump on stand or it may rotate on stand axis. Both the cases may cause serious injury to rider. Hence it is basic requirement to close the stand during riding.

1.2 Identification of Problem and Issues

Necessity is the mother of invention but during invention some trials got fail and some have problems. After recognition of necessity some problems and issues arise. These problems were related to designing part as selection of linkage, powering the linkage, position of link, length of arm, etc. For an Automatic Mechanical Bike Stand first problem was which link should be used to close the stand after that second one was powering of the linkages to retrieve the stand in closed position and the third was to make the cost lower with no extra power on bike.

1.3 Solution Approach

All the problems have solutions and these solution can be found after some experiments. As the above described problems and issues were shorted out.

The selection of linkage was solved by selection a mechanical bar link which will attached to stand and make the stand close during motion.

The link was powered by a free wheel which mounts a sprocket and attached to chain of bike. During the motion bike chain is the first visible or easily gotten motion part after wheels. The free wheel is required as the stand should not be closed during the reverse motion as bikes have no gear arrangement for reverse motion and if a bike moves in reverse direction surely it will manually that means the bike is not in running by engine power. And the use sprocket is to take the power from chain and make the linkage move.

As freewheel has a bearing support from body hence there is minute friction or it may be said no friction hence no extra power is required to make the arrangement moved.

2. WORKING

The working of Automatic Mechanical Bike Stand is like a cam and follower arrangement. A sprocket is attached to the chain of bike rear wheel and rotates with the chain motion. The sprocket is mounted on a free wheel which engages in bike forward motion and disengages in bike reverse motion. Free wheel consist an extended arm like a

lever which rotates with free wheel in bike forward motion. The free wheel is mounted on a bearing to provide smooth motion.

Bike stand has an L shaped pivoted arm which engages with free wheel extended arm after stand opening.

When the bike moves in forward direction and stand is opened, the sprocket rotates with free wheel and arm moves which pushes the pivoted arm of stand and the stand closes.

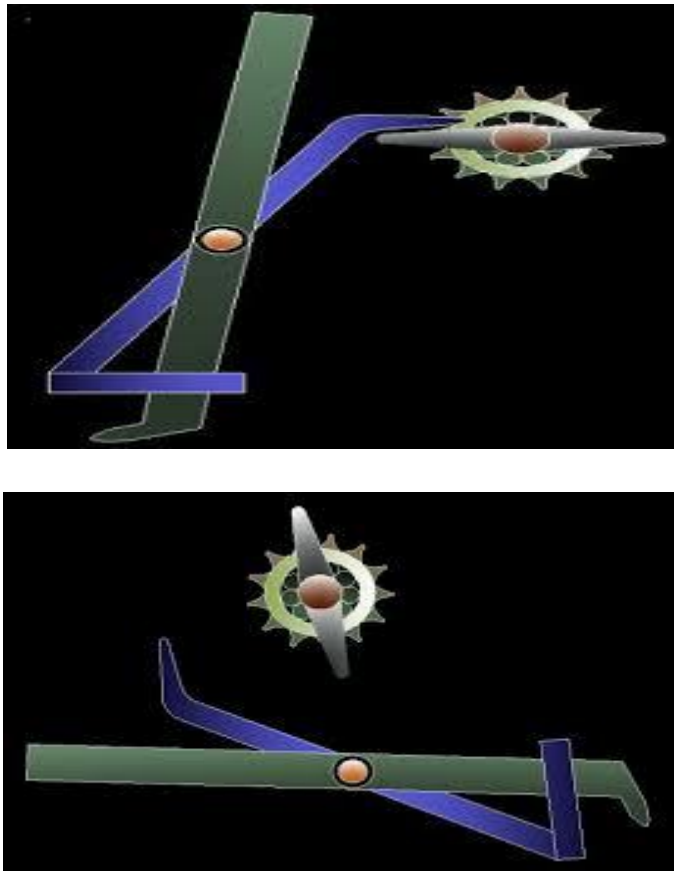

Fig: Schematic Diagram of Automatic Mechanical Bike Stand

3. RESULT

The system designed gives the desired output. The stand automatically closes during bike motion. The system has some drawbacks.

The sprocket rotates continuously in forward motion of bike which creates some extra noise.

The lever and arm creates noise during closing of stand due to high impact and spring forces. There may be some improvement in noise by using rubbers at mating edges. Further improvement may be done by modifying the linkage.

4. CONCLUSIONS

The task of making an automatic bike stand with the help of mechanical system completed with the final result of working. This system makes the ride safer than before by closing the opened stand during motion (forward).

Here also we get a minimum cost for making the system as only five parts are required which have sprocket, free wheel, extended arm (cam), pivoted arm (actuator) and a bearing. These component will not increase the cost of bike too much and also they do not require any extra arrangement either of power supply or any work. There mounting is also easy.

5. DIRECTION FOR FUTURE RESEARCH

In future the Automatic Mechanical Bike Stand can be modified and made in better way. Following are some suggestions for modification:

- Cam and lever arrangement can be exchanged with crank lever arrangement.
- Sprocket can be replaced by rack arrangement.
- The power provided to the linkage can be achieved by the engine gear box if gear box is modified at initial stage.
- The stand also can be closed by gear lever with extra arrangement.
- Electrical system with high durability can be adopted.

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