DESIGN AND ANALYSIS OF SAFETY SIDE STAND FOR MOTORCYCLE

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ABSTRACT

Life in twenty first century is very fast and sometimes unknowingly the rider starts the bike and move forward without pulling off the side stand because of urgency which may cause unavoidable accidents. To avoid such accidents cause due to the carelessness of rider, we may produce the new advancement in bike that as we press the gear lever, the cable wire get stretched due to the hook catch lock get delocked to lift the side stand automatically. There is a need of prevent the rider in this type of condition, which arises many times, hence, it is important to create one mechanism, which prevents the rider from the accidents caused due to ungifted side stand. The mechanism should be such that it should neither affect the original mechanism nor create make the side stand more bulky. In additional it should not increase the price of the bike. It is just a small mechanism, which operate the stand and operation will be easy. Therefore, it is necessary to have a separate attachment in a bike to lift up the side stand automatically.

The safety side stand relates to the side stand for general motorcycle. It is characterized by means to rigid the stand, in inclined area. When the motorbike is in the respite on a ramp, the typical stand would reverse, where as in safety stand the inverse action is locked, and simultaneously all the means for the movement of the bike is sealed by a trifling mechanism that works mechanically. The prototype was generated and analyzed using the Dassault System CatiaV5 software.

INTRODUCTION

Kick stand have been in use, since the early 18th century. In the year 1869 Albert Berruyer designed the earlier known kickstand. From then it has been reformed and reinvented many times. It was very long and was attached below the handle bars. Then the size of the stand was condensed and the side-stand style kick stand came to use from 19th century. Nowadays motorcycles are used throughout the creation. The side style kick stand plays a major role in driving the vehicle in rest position. This category of kickstand has two disadvantages:-

1) It is problematic to park the vehicle in the sloppy region.

2) If the handlerdisremembers to retract the stand, before riding the bike that will lead to hefty accidents.

In this safety stand, these two drawbacks have been eliminated. The normal design of the stand is not reformed. The normal stand is just fabricated with some attachments. The working is mechanically oriented with the help of spring locks. The motorcycle side stand is detained in both park and normal position with the help of over centred spring. The spring also affords stability and support for the motorcycle when parked.

DESIGN FEATURES

The structural components include,

A. Side stand.

B. Spring.

C. Stand lock attachment.

D. Accelerator lock attachment.

E. Clutch wire.

F. Clutch wire guide.

A. Side Stand

A normal side stand is fabricated. So for this purpose, the side stand of Royal Enfield Deluxe 350 is chosen. The bike side stand is shown in Fig.2.1. This stand is fabricated with a stand lock attachment.

Fig.2.1. Present side stand of Royal Enfield Deluxe 350

B. Springs

Springs are the chief element that locks the side stand in the place either up or down. The centre springused in side stand is shown in Fig. 2.2 In safety side stand, three springs are used.

1. Spring in stand lock attachment
2. Accelerator lock attachment spring
3. Side stand centre spring

Fig.2.2 Centre spring.

1.Spring in stand lock attachment

This spring controls the piston which curls the stand as it is entirely deployed andprevents the reverse movement of the spring, when the motor bike is parked in the sloppy area.

2.Accelerator lock attachment spring

The spring in the attachment controls the piston pin that locks the accelerator when the stand is in the rest position, and unlocks the accelerator when the stand is upright place.

3. Side stand spring

The side stand spring is stretched when it is partly deployed and less stretched when fully or way deployed.

C. Stand lock attachment

This attachment is used to keep the stand stable when the stand is deployed in the sloppy region in Fig. 2.3. This attachment has a locking piston that is controlled by the spring. This piston gets locked into the groove of the bolt and nut assembly of the stand, thus preventing the reverse action of the stand.

Fig. 2.3. Stand lock attachment.

D. Accelerator lock attachment

This attachment has a small piston which iscontrolled by the spring as shown in Fig. 2.4hole in the size of the piston is drilled in the acceleratorpipe, when it is in the rest position. When the stand ispulled down, the piston locks the accelerator and whenthe stand is released, the piston automatically unlocks theaccelerator.

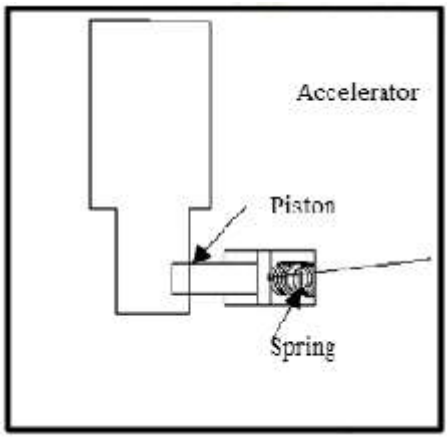

Fig. 2.4. Accelerator lock attachment.

E. Clutch Wire (or) break wire

Two clutch wires are used for two dissimilar purposes. One is the wire which connects the stand lock attachment and clutch. The other which connects the stand as well as the accelerator lock attachment.

F.Clutch wire guide

The clutch wire or break wire guide is used to direct the wire appropriately, as show in Fig.3.2. So that the normal functioning of the wire is not distressed.

WORKING

Stand in upright position

To lift the stand in upright position the clutch lever is pressed. This will lift the piston of the 'stand lock attachment' from the groove of the bolt and nut assembly as shown in Fig. 3.1. Now the stand is free to move and hence then it can be bought to upright position.

At the same time the piston of the 'accelerator lock attachment' is pulled by the stand with the aid of clutch wire and its guide, there by releasing the accelerator as shown in Fig. 3.2.

Fig. 3.1. Piston lifted up from groove.

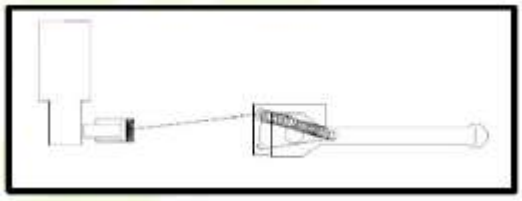

Fig. 3.2. Accelerator unlocked.

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Stand in all the way diploid position

When the stand is fully deployed, the piston of the 'stand lock attachment' locks the movement of the stand through grooves as shown in Fig.3.3.

At the same time the piston of the 'accelerator lock attachment' locks the accelerator as shown in Fig. 3.4.

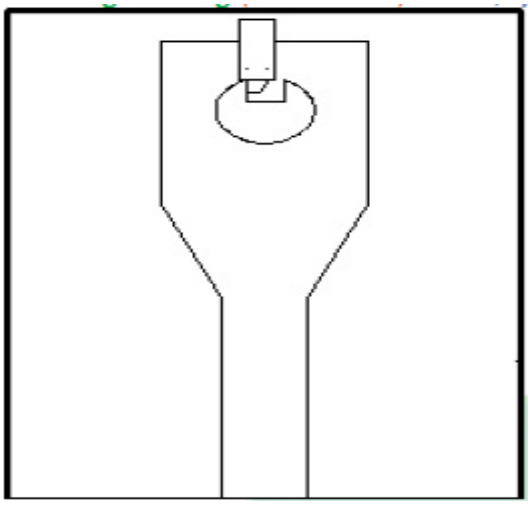

Fig. 3.3. Stand locked.

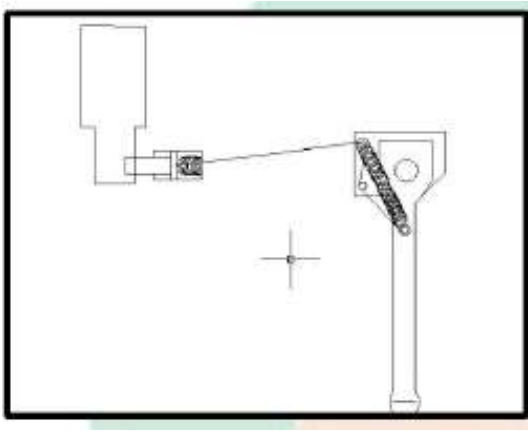

Fig.3.4. Accelerator locked.

1. ANALYSIS

A.Analysis I

- Stand analysed : Royal Enfield Deluxe 350.
- Material used : Stainless steel.
- Weight of bike : 187 kg.
- Assumed weight : 210 kg.
- Wight acting on stand : 70 kg.
- Load acting on stand : 686.7 N.

B. Analysis II

- Stand analysed : Royal Enfield Deluxe350.
- Material used : Grey cast iron.
- Weight of bike : 187 kg.
- Assumed weight : 210 kg.
- Wight acting on stand : 70 kg.
- Load acting on stand : 686.7 N.

C. Analysis III

- Stand analysed : Safety side stand.
- Material used : Stainless steel.
- Weight of bike : 187 kg.
- Assumed weight : 210 kg.
- Wight acting on stand : 70 kg.
- Load acting on stand : 686.7 N.

D. Analysis IV

- Stand analysed : Safety side stand.
- Material used : Grey cast iron.
- Weight of bike : 187 kg.
- Assumed weight : 210 kg.
- Wight acting on stand : 70 kg.
- Load acting on stand : 686.7 N.

2. RESULT AND DISCUSSION

- Discussions were made in the ensuing criteria
- Hitches faced by the people to park the two
- Wheeler in sloppy region.
- Living status of modern world.
- Side stand is the universal method to park the
- Motorcycle to rest when unattended
- Accidents caused due to side stand.
- Frame of motorcycle and its weight
- The result of the above all criteria is the safety side stand

Fig. 5.1.Safety side stand.

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CONCLUSION

The safety side stand design is proved as safe theoretically. We are in the progress of implementing the theoretical design practically. It is intended in a way not to affect the working of side stand and the frame of motor cycle. The safety side stand is informal to install, low inprice, well-organized, no extra power sourcemandatory. The design is very compact and so it does not affect the normal functioning of scrambler. This can be implemented in almost all kinds of commercial bikes.

Since the mechanism is fully based on springs the life of spring matters in the life of the stand. This can be augmented by using springs along with Pascal's principleof hydraulics.Associating with other kinds of stands thesafety stand will surely act as a life saver.

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