Title: CENTRE STAND FOR TWO WHEELERS

Abstract: A center stand for a two wheeler vehicle includes a support bracket secured to the chassis and supporting an actuator mechanism, a base stand, a resting mechanism, a load bearing mechanism and a spring mechanism. The actuator mechanism includes a power source actuated by a switch and an actuator rod coupled to the power source and that moves from retracted to extended position to cause center stand to move from horizontal to vertical position. The resting mechanism is coupled to base stand and includes a resting plate with bushings and a pair of rods that slide within the bushings as the base stand is lowered by actuator rod to stably lift the vehicle. The load bearing, mechanism is automatically actuated to take position simultaneously while actuator rod descends and bear weight of vehicle as actuator mechanism gets switched off to cause actuator rod to be free and vehicle to descend.
CENTRE STAND FOR TWO WHEELERS

This application is a patent of addition of Indian Patent Application No. IN1404/MUM/2008 filed on July 04th 2008, the entire contents of which are specifically incorporated herein by reference.

FIELD OF THE DISCLOSURE

The present disclosure generally relates to two wheelers stands:

Particularly the present disclosure relates to a center stand for two wheelers.

BACKGROUND

A two-wheeler vehicle such as a motorcycle or a scooter is essentially provided with parking stand. The stand is an essential component of the two-wheeler that facilitates parking of the two-wheeler. Conventional stands are generally a manual stand that is manually operated, wherein the stand is pivoted either to an engine, an engine-bracket or a frame of the two-wheeler. The pivotable stand is generally manually moved between an on-stand configuration, in which the stand rests on ground for supporting the two-wheeler for facilitating parking of the two-wheeler and an off-stand configuration, in which the stand moves away from the ground. The stand includes a spring that facilitates retracting of the stand back to an off-stand configuration or horizontal position from the on-stand configuration or vertical position thereof. However, in case of manually operated stands, the rider of the two-wheeler is required to get-off from the riding seat of the two-wheeler to move the stand between on-stand configuration and the off-stand configuration. Further, in case of manually operated stands lot of effort and time is required for moving the stand between on-stand configuration and the off-stand configuration. Further, moving of the stand between on-stand configuration and the off-stand configuration is difficult and
inconvenient for physical weak riders, particularly, women and senior citizens. Furthermore, manual operation of such manual stands may cause injury during operation thereof.

Automatically operated stands for two-wheeler are also known in the art, however, such automatically operated stands are in-effective and have serious limitations such as such conventionally known automatically operated stands are not reliable, are expensive, are energy inefficient and draw more power from the vehicle battery for operation thereof, thereby leading to quick draining of the vehicle battery and reduced life of the vehicle battery. Further, conventionally known automatically operated stands involve use of delicate elements such as actuators that are subjected to frequent loading and other undesirable service conditions such as jerks, shocks and cyclic loading that are detrimental for the service life of such delicate elements, thereby resulting in frequent failure of such delicate elements that are expensive. Generally, while operating the stand, as the stand is moving from the horizontal to vertical position, the stand is dragged on all sorts of roads during the parking of the two-wheeler vehicle consequently damaging the stand and also consuming more battery power. Also in most of the cases the load is acting on the actuator, when the two-wheeler vehicle is parked, causing damage to the actuator in the long run. Accordingly, conventionally known automatically operated stands require frequent maintenance and have high maintenance costs associated there-with. Further, the dependency of the conventionally known automatically operated stands on the vehicle battery is more and as such, conventionally known automatically operated stands fail to operate in case of weak or dead vehicle battery. Still further, conventionally known automatically operated stands fail to operate effectively if used for parking the two-wheeler vehicle on uneven surfaces/bridges and if the road conditions vary from the design conditions, specifically, conventionally known automatically operated stands fail to adjust
it-self with respect to ground conditions on which the two-wheeler vehicle is required to be parked.

Conventionally known automatically operated stands fail to operate when the two-wheeler vehicle is required to be parked on bridge/slopes. Furthermore, conventionally known automatically operated stands fail to stably support the two-wheeler vehicle and any forces acting on the two-wheeler vehicle, while the two-wheeler vehicle is supported on the automatically operated stand may cause the two-wheeler vehicle to get de-stabilized, fall and get damaged. Conventionally known automatically operated stands are bulky and not rigid. Conventionally known automatically operated stands are inoperable in case of dead vehicle battery and this puts the person in great difficulty as the two-wheeler vehicle becomes immobile. Further, conventionally known automatically operated stands do not provide any ground clearance while operating from the horizontal position to vertical position on most of the roads, thereby causing damage to the stand in long run as well as to the actuator and also consuming more battery power in this case as the stand is dragged with the full load of the two-wheeler.

Accordingly, there is a need for an automatically operated stand that reduces the loading on the delicate elements thereof and also reduces exposure of these delicate elements to the undesirable operational conditions such as jerks and shocks, thereby reducing the detrimental impact of these over the service life of such delicate elements and enhancing the reliability and service life of the automatically operated stand. Further, there is a need for an automatically operated stand that eliminates drawbacks associated with most of the dragging during operation of the stand. More specifically, there is a need for an automatically operated stand that while turning from horizontal position to vertical position has ground clearance and thereafter supports the two-wheeler vehicle thereon for parking while operating on most of the roads and while
parking on the slope or on the bridge, the stand is so designed that it easily takes the load without the stand getting dragged or damaged or without damaging the actuator and can therefore park/de-park the two-wheeler vehicle conveniently. Further, there is a need for an automatically operated stand that has low maintenance costs associated there-with. Furthermore, there is a need for an automatically operated stand whose dependency on the vehicle battery is considerably reduced and that the mobility of the two-wheeler vehicle is not affected and the two-wheeler vehicle can be moved/manually pushed and taken in case of complete breakdown of the two-wheeler vehicle or in case of dead vehicle battery by using the manual lever that is specially designed to de-park the two-wheeler in case the battery fails. Furthermore, there is a need for an automatically operated stand that adjusts itself well, thereby enabling parking of the two-wheeler on bridge/slopes. Still further, there is a need for an automatically operated stand that stably supports the two-wheeler vehicle. Further, there is a need for an automatically operated stand that can be conveniently moved between the off-stand configuration and the on-stand configuration while the rider is still seated on the two-wheeler vehicle. Still further, there is a need for an automatically operated stand that can be quickly moved between the off-stand configuration and the on-stand configuration without requiring any effort. Furthermore, there is a need for an automatically operated stand that is simple to use, reliable, sturdy and rigid in construction. Still further, there is a need for an automatically operated stand that is simple in construction and easy to manufacture. Furthermore, there is a need for an automatically operated stand that may be retrofitted to any conventional two wheeler vehicle without requiring many modifications. Furthermore, there is a need for an automatically operated stand which has no load on the actuator rod/hydraulic cylinder rod when parked as the load of the two-wheeler is completely on the weight bearing mechanism of the automatic stand.
OBJECTS

Some of the objects of the present disclosure which at least one embodiment satisfies, are described herein below:

It is an object of the present disclosure to ameliorate one or more problems of the prior art or to at least provide a useful alternative.

An object of the present invention is to provide an automatically operated stand that reduces the loading on the delicate elements thereof and also reduces exposure of these delicate elements to the undesirable operation conditions such as dragging, jerks and shocks, thereby reducing the detrimental impact of these over the service life of such delicate elements and enhancing the reliability and service life of the automatically operated stand.

Another object of the present disclosure is to provide an automatically operated stand that has low maintenance costs associated there-with.

Still another object of the present disclosure is to provide an automatically operated stand that eliminates drawbacks associated with most of the dragging during operation of the stand.

Another object of the present disclosure is to provide an automatically operated stand that maintains ground clearance while turning from horizontal position to vertical position and thereafter supports the two-wheeler vehicle thereon for parking while operating on most of the roads, thereby eliminating damage to the stand as well as the actuator during operation.

Yet another object of the present disclosure is to provide an automatically operated stand with reduced dependency on the vehicle battery for operation thereof.
Another object of the present disclosure is to provide an automatically operated stand that permits the two-wheeler vehicle to be moved/manually pushed and taken in case of complete breakdown of the two-wheeler vehicle or in case of dead vehicle battery.

Still another object of the present disclosure is to provide an automatically operated stand that can operate even in case of weak or dead vehicle battery.

Another object of the present disclosure is to provide an automatically operated stand that adjusts itself according to ground conditions on which the two-wheeler vehicle is required to be parked, thereby enabling parking of the two-wheeler on slopes or uneven surfaces.

Still another object of the present disclosure is to provide an automatically operated stand that stably supports the two-wheeler vehicle.

Another object of the present disclosure is to provide an automatically operated stand that can be conveniently moved between the off-stand configuration and the on-stand configuration while the rider is still seated on the two-wheeler vehicle.

Still another object of the present disclosure is to provide an automatically operated stand that can be quickly moved between the off-stand configuration and the on-stand configuration without requiring much effort.

Another object of the present disclosure is to provide an automatically operated stand that is simple to use, reliable and sturdy in construction.

Still another object of the present disclosure is to provide an automatically operated stand that is simple in construction and easy to manufacture.
Still another object of the present disclosure is to provide an automatically operated stand for a two-wheeler vehicle, wherein the weight of the two-wheeler is resting on the weight bearing mechanism and not on the actuator.

Yet another object of the present disclosure is to provide an automatically operated stand that may be retrofitted to a conventional two wheeler without requiring many modifications.

SUMMARY

A center stand system for a two wheeler vehicle adapted to move between an unfolded, operative, vertical configuration in which the center stand provides support to the vehicle and a folded, in-operative, horizontal configuration in which the center stand withdraws support to the vehicle. The center stand system includes an actuator support bracket, an actuator mechanism, a base stand, a resting mechanism, a load bearing mechanism and a spring mechanism. The actuator support bracket is secured to a chassis of the vehicle and is depending therefrom. The actuator mechanism is disposed within the actuator support bracket and includes an actuator power source and an actuator rod. The actuator power source is actuated by a power switch. The actuator rod is functionally coupled to the actuator power source and descends and moves from a retracted position to an extended position to cause the center stand system to move from a horizontal position to a vertical position. The base stand is functionally coupled to the actuator rod and is lowered to touch the ground by further actuation of the actuator mechanism. The base stand has a plurality of legs that rests on the ground to provide support to the vehicle as the base stand is lowered. The resting mechanism is functionally coupled to the base stand and includes a resting plate and a pair of rods. The resting plate has a pair of bushings configured thereon. The pair of rods slide within the bushings as the base stand is lowered by the actuator rod to facilitate stable lifting of the two-
wheeler vehicle by the actuator mechanism. The load bearing mechanism is functionally coupled to the resting mechanism and the base stand. The load bearing mechanism is automatically actuated to take position for receiving weight of the two-wheeler simultaneously while the actuator rod is descending. The load bearing mechanism further bear weight of the two-wheeler as the actuator mechanism gets switched off and the actuator rod is free to move to facilitate descending of the two-wheeler vehicle under its own weight and enabling the load bearing mechanism to take over weight of the two-wheeler vehicle. The spring mechanism isolates the load bearing mechanism and the actuator mechanism from impact that comes on the actuator rod once the weight bearing mechanism opens in order to de-lift the two-wheeler. The spring mechanism further facilitates gradual de-parking of the two-wheeler.

Typically, the actuator power source is a motor.

Alternatively, the actuator power source is a hydraulic piston cylinder arrangement.

In accordance with another embodiment the actuator power source is a pneumatic piston cylinder arrangement.

The center stand system further includes a limit switch that switches off the actuator power source as the actuator rod descends by a pre-determined distance, thereby stopping further descend of the actuator rod.

Typically, the load bearing mechanism includes a pair of load bearing members pivotably movable with respect to the base stand and that take a position for receiving the weight of the two-wheeler and ultimately bear the weight of the two-wheeler.
Generally, the spring mechanism is a spring plunger mechanism that has a spring element connected to a plunger, wherein each set of spring element and plunger is disposed inside a corresponding cavity configured on the resting plate so that the spring plunger mechanism urges the pair of load bearing members such as to support the two-wheeler vehicle and facilitate gradual de-parking of the two-wheeler.

Further, the center stand system includes a spring element that is compressed to change configuration thereof from a normal, in tension configuration and a compressed configuration, the spring element assists the center stand to move from horizontal position to vertical position and while the two-wheeler is being de-parked the spring element is holds the center stand in vertical position till the rods moves inside the bushings and then allow the base stand and the resting plate to turn from vertical to horizontal position.

Typically, the actuator mechanism is spaced from the actuator support bracket to facilitate self-adjustment thereof.

Generally, the actuator mechanism is a screw actuator.

Alternatively, the actuator mechanism is a hydraulic mechanism.

Further, the center stand system further includes an actuator bracket secured to the actuator support bracket and that provide additional support to the actuator mechanism supported within the actuator support bracket.

In accordance with an embodiment, the spring mechanism of the center stand system includes spring elements disposed between both the load bearing members of the load bearing mechanism, the spring elements facilitate gradual opening of the load bearing mechanism and prevent the impact of the weight of the two-wheeler coming on the actuator rod when the load bearing mechanism opens.
In accordance with another embodiment, the spring mechanism of the center stand system includes a pair of clip springs mounted on the pair of rods such that each clip spring is disposed between a corresponding rod and a bushing and facilitates gradual sliding of the rods, thereby facilitating gradual de-parking of the vehicle when the load bearing mechanism opens, the clip spring further prevents the impact of the weight of the two-wheeler coming on the actuator rod when the load bearing mechanism opens.

Further, the center stand system also includes a lever mechanism functionally coupled to the load bearing mechanism and that manually opens the load bearing mechanism in case the battery fails as the actuator is inoperative in this condition, thereby facilitating manual de-parking of the two-wheeler also.

**BRIEF DESCRIPTION OF ACCOMPANYING DRAWING**

The center stand system of the present disclosure will now be explained in relation to the non-limiting accompanying drawing, in which:

Figures 1a to 1d illustrates various views of a center stand of a two wheeler vehicle, in accordance with one embodiment of the present disclosure;

Figures 2a to 2i illustrates various views of a resting bracket with a spring plunger mechanism of the center stand of Figures 1a to 1d;

Figures 3a to 3e illustrates various views of a spring plunger of the spring mechanism of the center stand;

Figures 4a to 4d illustrate various views of a base stand of the center stand system;

Figures 5a to 5e illustrate various views of a rotating block of the center stand system;
Figures 6a to 6d illustrate various views of a c-clamp with a slot;

Figures 7a to 7d illustrate various views of a load bearing member of a load bearing mechanism;

Figures 8a to 8d illustrate various views of an actuator bracket;

Figures 9a to 9b illustrate various views of an actuator support bracket;

Figures 10a to 10c illustrate various views of a top plate;

Figures 11a to 11d illustrate various views of a pin secured to an actuator rod and a C-bracket of the center stand;

Figures 12a to 12d illustrate various views of a lever of a lever mechanism; and

Figures 13a to 13c illustrate various views of a lever bracket of the lever mechanism.

Figure 14 illustrates a schematic representation of a center stand system in accordance with an embodiment, wherein a first spring element assists the center stand system to turn from horizontal position to vertical position;

Figure 15 illustrates a schematic representation of a center stand system in accordance with another embodiment, wherein a plurality of spring elements are disposed between both the load bearing members of the load bearing mechanism in order to facilitate gradual opening of the load bearing mechanism and preventing impact of the actuator rod on the main stand; and

Figure 16 illustrates a clip spring secured in a rod of a pair of rods and disposed between the rod and a corresponding bushing, the clip spring facilitate gradual opening of the load bearing mechanism and preventing the impact of the actuator rod on the main stand.
DETAILED DESCRIPTION OF THE ACCOMPANYING DRAWINGS

The center stand system for a two wheeler vehicle of the present disclosure will now be described with reference to the accompanying drawings which do not limit the scope and ambit of the disclosure. The description provided is purely by way of example and illustration.

The embodiments herein and the various features and advantageous details thereof are explained with reference to the non-limiting embodiments in the following description. Descriptions of well-known components and processing techniques are omitted so as to not unnecessarily obscure the embodiments herein. The examples used herein are intended merely to facilitate an understanding of ways in which the embodiments herein may be practiced and to further enable those of skill in the art to practice the embodiments herein. Accordingly, the examples should not be construed as limiting the scope of the embodiments herein.

The description hereinafter, of the specific embodiments will so fully reveal the general nature of the embodiments herein that others can, by applying current knowledge, readily modify and/or adapt for various applications such specific embodiments without departing from the generic concept, and, therefore, such adaptations and modifications should and are intended to be comprehended within the meaning and range of equivalents of the disclosed embodiments. It is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation. Therefore, while the embodiments herein have been described in terms of preferred embodiments, those skilled in the art will recognize that the embodiments herein can be practiced with modification within the spirit and scope of the embodiments as described herein.
Referring to Figures 1 to 13c, a center stand system 100 for a two wheeler vehicle is disclosed. A switch unit (not shown) is fitted on the handle of the two-wheeler and operates the center stand system 100. Figures 1a to 1d illustrates various views of a center stand system 100 for a two wheeler vehicle.

The center stand system 100 includes an actuator support bracket 154 also referred to as an actuator holding frame, an actuator mechanism/hydraulic mechanism 200, a base stand 600, a rotating block 300 also referred to as a resting plate of a resting mechanism, a load bearing mechanism 350, a spring plunger mechanism 500. The center stand system further includes a lever mechanism 400. The center stand system 100 also includes a c-clamp 120 with a slot 122, a sliding spring plunger 502, a mounting top plate support 140 and an actuator bracket 150.

The actuator support bracket 154 is secured to a chassis of the vehicle and is depending there-from. In one embodiment, the actuator mechanism 200 is a ball screw actuator. In another embodiment, the actuator mechanism 200 is a hydraulic mechanism. However, the present disclosure is not limited to any particular type of actuators described. The actuator mechanism 200 facilitates a folded condition and an unfolded condition of the center stand system 100. In the unfolded condition, the vehicle is supported on the center stand system 100. In the folded condition, the center stand system 100 is in inoperative position and the two wheeler vehicle is in moving configuration.

The actuator mechanism 200 includes an actuating rod 210 for facilitating folded and un-folded configuration of the base stand 600. The actuator mechanism 200 is disposed within the actuator support bracket 154 and facilitates movement of the center stand system 100 between the unfolded, operative configuration and the folded, in-operative configuration. More specifically, the actuator mechanism 200 includes a motor and the actuator rod
The motor is actuated by a power switch that is disposed near the handle of the two-wheeler and is easily accessible by the rider of the two-wheeler. The actuator rod 210 is functionally coupled to and derives power from the motor. The actuator rod 210 moves from a retracted position to an extended position to cause the center stand system 100 to move from a horizontal position to a vertical position without touching the ground on most of the roads. More specifically, the actuator rod 210 moves between the retracted position in which the actuator rod 210 is received within the actuator support bracket 154 and an extended position in which the actuator rod 210 is at least partially pushed out of the actuator support bracket 154. The actuator rod 210 is having a pin secured to an operative bottom end thereof. The motor is actuated by a power switch disposed near the handle bar of the two-wheeler vehicle. In accordance with an embodiment, instead of motor another actuator power source such as a pneumatic piston cylinder arrangement actuated by a power switch can be used. In accordance with another embodiment, instead of motor another actuator power source such as a hydraulic piston cylinder arrangement actuated by a power switch can be used. The actuator mechanism 200 further includes a limit switch that switches off the motor as the actuator rod 210 descends by a predetermined distance, thereby stopping further descend of the actuator rod 210.

The actuator mechanism 200 of the present disclosure is self-adjusting type. The actuator mechanism 200 is supported on the actuator support bracket 154 or the actuator holding frame structure 154 in a way such that there is certain gap maintained between the actuator holding frame structure or the actuator support bracket 154 and the actuator mechanism 200. This arrangement facilitates self-adjustment of the actuator mechanism 200 to compensate load and road condition.
Further, the actuator support bracket 154 is so connected with the resting plate and the base stand 600 that there is some degree of play between the actuator support bracket 154 and the resting plate to adapt automatically to different conditions while parking the two-wheeler vehicle, this play will prevent damage of the stand due to undue stresses. The base stand 600 is functionally coupled to the actuator rod 210 and is lowered to touch the ground by further actuation of the actuator mechanism 200. The base stand 600 has a plurality of legs 602 that rests on the ground to provide support to the vehicle as the base stand 600 is lowered. The plurality of legs 602 provides rigid support to the two wheeler vehicle. Also, the plurality of legs 602 is adapted in such a way that it also provides stable support on slope/ bridge. Figures 4a to 4d illustrate various views of a base stand 600 of the center stand system 100.

The actuator mechanism 200 is functionally connected to the rotating block 300. The rotating block 300 is adapted to configure pivotable movement with respect to the actuator mechanism 200. More specifically, the rotating block 300 and the base stand 600 in combination is adapted to configure pivotable movement with respect to the actuator mechanism, 200. The rotating block 300 includes a pair of bushings 113 configured thereon. The bushings 113 interact with the pair of rods "R", disposed on the base stand 600 to bring the base stand 600 in the parking position and for facilitating unfolded configuration of the stand 100, which is facilitated by the actuator mechanism 200. Also, the bushings 113 and the pair of rods "R" facilitate alignment with the actuator rod 210 of the actuator mechanism 200 for facilitating stable support when the two wheeler vehicle is in the parked position. More specifically, as the actuator rod 210 of the actuator mechanism 200 moves down or up, the pair of rods "R" of the base stand 600 also moves with respect to the pair of bushing 113 and this keeps the base stand 600 rigid. Also, the bushings 113 and the pair of rods "R" are adapted to take load during parking and de-parking. There is also provided
a bearing between each rod "R" of the pair of rods and the corresponding bushings 113 to facilitate easy sliding of the rods within the bushings 113.

Referring to Figures 2a to 2i, various views of the rotating block 300 along with a spring plunger mechanism 500 of the center stand 100 are illustrated.

The rotating block 300 and the base stand 600 are operated by the actuator mechanism 200. The rotating block 300 is functionally coupled to the base stand 600. The rotating block 300 has a pair of bushings 113 and cavities 306 configured thereon. The pair of rods "R" slide within bushings 113 as the base stand 600 is lowered by the actuator rod 210 to facilitate stable lifting of the two-wheeler vehicle by the actuator mechanism 200.

The load bearing mechanism 350 is functionally coupled to the rotating block 300 and the base stand 600. The load bearing mechanism 350 is automatically actuated to take position for receiving weight of the two-wheeler simultaneously while the actuator rod 210 is descending, and the load bearing mechanism 350 further adapted to bear weight of the two-wheeler as the actuator mechanism 200 gets switched off and the actuator rod 210 is free to move to facilitate descending of the two-wheeler vehicle under its own weight and enabling the load bearing mechanism 350 to take over weight of the two-wheeler vehicle.

The load bearing mechanism 350 includes a pair of load bearing members 360 such that even if one of the load bearing member 360 is not operating the load bearing mechanism 350 can still bear the weight of the two-wheeler on the other load bearing member. The load bearing members 360 while bearing the load of the two-wheeler vehicle come in contact with and engage with the end stopper.

The pair of load bearing members 360 are pivotally connected to the base stand 600, wherein each load bearing lever 360 has rolling elements 370 rotatably mounted to one end thereof to support the rotating block 300.
Figures 7a to 7d illustrate various views of the load bearing members360 of the load bearing mechanism 350. The load bearing mechanism 350 is functionally coupled to the rotating block 300.

The actuator 200 is specially adapted to after lifting the two wheeler will lose the thrust (power) required for holding two wheeler on the actuator rod 210 and the actuator rod 210 will instead return back with the load of the two wheeler after reaching a predetermine length, thereafter, the weight of the two wheeler is transferred on the load bearing mechanism 350 which has already been automatically actuated to take position to receive the weight of the two-wheeler vehicle and facilitate parking of the two-wheeler. The load bearing mechanism 350 is spring loaded.

More specifically, the actuator rod 210 during initial stages of the parking operation, just after lifting the two-wheeler loses the thrust (power) required for holding the two-wheeler as the actuation mechanism is disabled by turning off of the motor by the limit switch. Once the weight of the two-wheeler vehicle rests on the load bearing mechanism 350, the actuator rod 210 is completely free of any load of the two-wheeler and the weight of the two-wheeler is completely on the automatically activated load bearing mechanism 350 of the stand. At this instance, the weight of the two-wheeler is acting the load bearing mechanism 350 which is capable of withstanding the load of the two-wheeler when it is in parked condition. The load bearing mechanism 350 can withstand load up-to 400 kgs.

With such configuration reliability and service life of the actuator rod 210 is enhanced. Referring to Figure 15, the actuator rod 210 is away from the base stand 600 and therefore free from the load of the parked two-wheeler and the load bearing mechanism 350 bears the weight of the two-wheeler vehicle. The pair of load bearing members 360, wherein each load bearing member 360 is
having rolling element 370 rotatably mounted to one end thereof that support the rotating block 300 when the weight of the two-wheeler is on the load bearing mechanism.

In accordance with another embodiment, the center stand system 100 further includes a first spring element 180 that is compressible to change configuration thereof between a normal, in tension configuration and a compressed configuration, the first spring element 180 assists the center stand system 100 to move from horizontal position to vertical position and while the two-wheeler is being de-lifted the spring 180 holds the stand in vertical position till the rods "R" moves inside the bushings and then will allow the base stand 600 and the resting plate 500 to turn from vertical to horizontal position. Instead of spring/first spring element any other linkage can be used. The first spring element 180 is disposed parallel to the actuator rod 210.

The lever 158 of the lever mechanism 400 is functionally connected to the base stand 600 and the rotating block 300. A pair of load bearing mechanism/supports 350 is functionally connected to the rotating block 300. The center stand system 100 is adapted to work even on one of the load bearing mechanisms 350 in case of failure of the other mechanism.

The lever mechanism 400 facilitates defining of the in-operative configuration of the center stand 100, particularly, the de-lifting of the two wheeler vehicle when the battery is dead. More specifically, the lever mechanism 400 includes a lever 158 that is manually pressed so that the load bearing mechanism 350 opens out automatically and this opening facilitates de-lifts the two wheeler vehicle. The load bearing mechanism 350 is functionally coupled to the rotating block 300 and includes load bearing members 360.

Figures 3a to 3e illustrates various views of a spring plunger of the spring mechanism 500 of the center stand 100. The spring plunger of the spring
mechanism 500 includes a spring element 504 mounted over the plunger element 502. The spring plunger mechanism 500 / clip spring or any mechanism to prevent impact coming on the actuator rod and the base stand may also be referred to as a jerk absorbing mechanism. In one embodiment, the spring plunger mechanism 500 includes four spring elements 504 disposed at the required positions. Each of the four springs is connected to the plungers 502. The plungers and spring assembly are positioned in the cavities 506 made on the rotating block 300 in a way such that this assembly starts engaging with the loadbearing mechanism or load bearing mechanism 350 at particular point to absorb the load of the two wheeler vehicle when de-lifting the two wheeler vehicle.

In accordance with another embodiment, a plurality of spring elements 170 referred to as second spring elements (as illustrated in Figure 15) can be disposed between both the load bearing members 360 of the load bearing mechanism 350, the spring elements 170 replace the spring elements 504 and the plungers 502 and facilitate slow opening of the load bearing mechanism 350 and preventing the impact of the two-wheeler vehicle by hitting the actuator rod 210 during de-parking of the two-wheeler vehicle. More specifically, the load bearing mechanism 350 is spring loaded so that when the two wheeler vehicle is being de-parked, the two wheeler vehicle will not have a sudden fall and an impact on the actuator shaft 210 or on the auto stand is prevented.

In accordance with another embodiment clip springs 190a and 190b are mounted on the pair of rods R, particularly, with each clip spring mounted on a corresponding rod of the pair of rods R such that the clip spring is between the rod R and the corresponding bushing. The clip springs 190a and 190b serves two purposes, one is when the rod "R" is inside the bushing, the clip springs engage with the bushings and prevent easy sliding movement of the rods with respect to the bushings till the stand moves from horizontal to vertical position. The clip
springs 190a and 190b prevents the impact of the weight of the two-wheeler coming on the actuator rod when the load bearing mechanism opens. The weight of the two-wheeler is transferred to the clip springs 190a and as the clip springs engages with the bushing and therefore the two-wheeler de-parks gradually when the load bearing mechanism 350 opens, thereby preventing an impact of the base stand 600 on the actuator rod 210. Although, the spring clips 190a and 190b, the spring elements 170, and the spring and plunger arrangement that includes the spring 504 and the plunger 502 perform the same function of facilitating gradual de-parking of the two-wheeler for preventing the two-wheeler vehicle from hitting the actuator rod. However, any one of the clip spring 190a and 190b, the spring elements 170, and the spring and plunger or any other arrangement can be used and the present disclosure is not limited to the above mentioned spring mechanism only. The design of the rotating block 300 are configured in such a way that while de-lifting the two wheeler vehicle, the spring plunger goes inside the body of the rotating block 300 and the load bearing mechanism passes over it without there being any hindrance. Once the load bearing passes over, the plunger mechanism comes over to its original position and by this time the rear tire of the two wheeler vehicle is about to touch the ground. More specifically, the spring plunger mechanism 500 isolates the load bearing mechanism 350 and the actuator mechanism 200 from impact loads and includes sets of spring element 504 connected to a plunger 502, wherein each set of spring element and plunger is disposed inside a corresponding cavity 506 configured on the resting plate 310 so that the spring plunger mechanism urges the pair of load bearing members 340 towards each other such that linkages 340 are maintained in the outwardly extended, open V-configuration to stably maintain the base stand 600 in unfolded, operative configuration. The spring plunger mechanism 500 prevents sudden falling or jerking of the two wheeler
vehicle while de-lifting the two wheeler vehicle. In other words, the spring plunger mechanism 500 prevents sudden load/ impact load on the actuator/ stand/ two wheeler vehicles and the load bearing mechanism 350, thereby enhancing the life of the actuator / stand/ two wheeler vehicle and the load bearing mechanism. Also, the plunger and spring assembly facilitate gradual load application on the load bearing mechanism 350 once the load bearing mechanism 350 is in V-shape. The V-shape of the load bearing mechanism also facilitates the actuator to work easily with nearly no load, as the weight of the two wheeler vehicle itself helps in de-lifting the two wheeler vehicle and more specifically, in case of the failure of the battery while operating with the manual lever. Figures 12a to 12d illustrate various views of a lever 158 or the manual lever. The manual lever 158 can be used in case the battery fails so the person can manually de-park the two-wheeler vehicle just by actuating the manual lever 158. The center stand can operate in two modes, one is automatic mode wherein the center stand derives operating power from a battery which already exists in the two-wheeler and the other is manual mode when the battery fails to de-park the two-wheeler. In the manual mode a person manually actuates the lever to de-park the two-wheeler from the auto stand. Once the actuator motor gets cut-off because of the limit switch in the actuator, the actuator rod 210 (stroke) will automatically go inside the actuator's body because of the load of the two-wheeler coming on it and therefore ultimately the two-wheeler will rest on the load bearing mechanism 350.

While de-lifting the two wheeler vehicle, the actuator rod is retracted by means the actuator motor. Once the actuator rod is moved up, the pin which is inserted in the hole of the lower part of the actuator rod also gets lifted up along with the actuator rod. The pin in the actuator rod now comes in contact with the load bearing mechanism 350 and consequently, the load bearing mechanism 350 starts opening out and is pushed to the V-shape by the pin which is inserted in
the hole of the actuator rod. As the actuator is pulling the stand in the folding position, the load bearing mechanism opens completely in order to allow the two-wheeler to be de-parked. Once the two-wheeler is de-parked the pin in the actuator rod holds the stand up in the horizontal position completely.

The center stand system 100 of the present disclosure facilitates parking of the two wheeler vehicle even when the driver/ rider of the vehicle is still seated on the vehicle. The center stand system 100 is configured in such a way that the rotating block 300, the spring mechanism 500 and the base stand 600 are always in aligned position with each other for facilitating rigid support, enhanced stability and smooth functioning of the center stand system 100. The pivot point from where the stand turns from horizontal to vertical position automatically allows the two wheeler vehicle to adjust itself as per the conditions of the road, as there is a cavity adapted for the same.

Referring to Figure 8a- Figure 8c, the actuator bracket 150 is illustrated. The actuator bracket 150 is secured to the actuator support bracket 154 and supports the actuator mechanism 200 supported within the actuator support bracket 154.

TECHNICAL ADVANCEMENTS AND ECONOMICAL SIGNIFICANCE

The technical advancements offered by the system of the present disclosure which add to the economic significance of the disclosure include the realization of:

- an automatically operated stand that reduces the loading on the delicate elements thereof and also reduces exposure of these delicate elements to the undesirable operation conditions such as jerks, dragging and shocks, thereby reducing the detrimental
impact of these over the service life of such delicate elements and
enhancing the reliability and service life of the automatically
operated stand;

- an automatically operated stand that eliminates drawbacks
  associated with most of the dragging during operation of the stand;

- an automatically operated stand that maintains ground clearance
  while turning from horizontal position to vertical position and
  thereafter supports the two-wheeler vehicle thereon for parking
  while operating on most of the roads, thereby eliminating damage
to the stand as well as the actuator during operation;

- an automatically operated stand having an actuator support bracket
  that is so connected with the rotating block that there is some
degree of play between the actuator support bracket and the
rotating block to adapt automatically to different conditions while
parking the two-wheeler vehicle, this play will prevent damage of
the stand due to undue stresses and also provides rigid and firm
support to the two-wheeler;

- an automatically operated stand that has low maintenance costs
  associated there-with;

- an automatically operated stand that has base stand with legs so
  configured that the legs facilitate gripping of the ground and
  assist in easy lifting of the two-wheeler and parking it rigidly;

- an automatically operated stand for a two-wheeler vehicle,
  wherein the weight of the two-wheeler is resting on the weight
  bearing mechanism and not on the actuator;
- an automatically operated stand that can be used in de-parking the two-wheeler in case of battery break-down by manually operating the lever;
- an automatically operated stand that permits the two-wheeler vehicle to be moved/manually pushed and taken in case of complete breakdown of the two-wheeler vehicle or in case of dead vehicle battery;
- an automatically operated stand with reduced dependency on the vehicle battery for operation thereof;
- an automatically operated stand that can operate even in case of weak or dead vehicle battery;
- an automatically operated stand that adjusts itself according to ground conditions on which the two-wheeler vehicle is required to be parked, thereby enabling parking of the two-wheeler on slopes or uneven surfaces;
- an automatically operated stand that stably supports the two-wheeler vehicle;
- an automatically operated stand that can be conveniently moved between the off-stand configuration and the on-stand configuration while the rider is still seated on the two-wheeler vehicle;
- an automatically operated stand that can be quickly moved between the off-stand configuration and the on-stand configuration without requiring much effort;
- an automatically operated stand that reduces time required for parking and de-parking of the two-wheeler vehicle;
• an automatically operated stand that facilitates parking and de-parking of the two-wheeler even when said two-wheeler is in constrained space;
• an automatically operated stand that is simple to use, reliable and sturdy in construction;
• an automatically operated stand that may be retrofitted to a conventional two wheeler without requiring many modifications; and
• an automatically operated stand that is simple in construction and easy to manufacture.

Throughout this specification the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated element, integer or step, or group of elements, integers or steps, but not the exclusion of any other element, integer or step, or group of elements, integers or steps.

The use of the expression "at least" or "at least one" suggests the use of one or more elements or ingredients or quantities, as the use may be in the embodiment to achieve one or more of the desired objects or results.

Any discussion of documents, acts, materials, devices, articles or the like that has been included in this specification is solely for the purpose of providing a context for the disclosure. It is not to be taken as an admission that any or all of these matters form part of the prior art base or were common general knowledge in the field relevant to the disclosure as it existed anywhere before the priority date of this application.

The numerical values mentioned for the various physical parameters, dimensions or quantities are only approximations and it is envisaged that the values higher/lower than the numerical values assigned to the parameters, dimensions or quantities fall
within the scope of the disclosure, unless there is a statement in the specification specific to the contrary.

The foregoing description of the specific embodiments will so fully reveal the general nature of the embodiments herein that others can, by applying current knowledge, readily modify and/or adapt for various applications such specific embodiments without departing from the generic concept, and, therefore, such adaptations and modifications should and are intended to be comprehended within the meaning and range of equivalents of the disclosed embodiments. It is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation. Therefore, while the embodiments herein have been described in terms of preferred embodiments, those skilled in the art will recognize that the embodiments herein can be practiced with modification within the spirit and scope of the embodiments as described herein.
CLAIMS:

1. A center stand system for a two wheeler vehicle adapted to move between an unfolded, operative, vertical configuration in which the center stand provides support to the vehicle and a folded, in-operative, horizontal configuration in which the center stand withdraws support to the vehicle, said center stand comprising:
   • an actuator support bracket secured to a chassis of the vehicle and depending therefrom;
   • an actuator mechanism disposed within said actuator support bracket and comprising:
     o an actuator power source actuated by a power switch; and
     o an actuator rod functionally coupled to said actuator power source and adapted to descend and move from a retracted position to an extended position to cause said center stand system to move from a horizontal position to a vertical position;
   • a base stand functionally coupled to said actuator rod and adapted to be lowered to touch the ground by further actuation of said actuator mechanism, said base stand has a plurality of legs adapted to rest on the ground to provide support to said vehicle as the base stand is lowered;
   • a resting mechanism functionally coupled to said base stand and comprising:
     o a resting plate has a pair of bushings configured thereon; and
     o a pair of rods adapted to slide within said bushings as said base stand is lowered by said actuator rod to facilitate stable lifting of said two-wheeler vehicle by said actuator mechanism;
   • a load bearing mechanism functionally coupled to said resting mechanism and said base stand, said load bearing mechanism adapted to be automatically actuated to take position for receiving weight of the two-wheeler simultaneously while said actuator rod is descending, said load bearing
mechanism further adapted to bear weight of the two-wheeler as said actuator mechanism gets switched off and said actuator rod is free to move to facilitate descending of the two-wheeler vehicle under its own weight and enabling said load bearing mechanism to take over weight of said two-wheeler vehicle; and

- a spring mechanism adapted to isolate said load bearing mechanism and said actuator mechanism from impact that comes on said actuator rod once said weight bearing mechanism opens in order to de-lift the two-wheeler, said spring mechanism further adapted to facilitate gradual de-parking of said two-wheeler.

2. The center-stand system as claimed in Claim 1, wherein said actuator power source is a motor.

3. The center stand system as claimed in Claim 1, wherein said actuator power source is a hydraulic piston cylinder arrangement.

4. The center stand system as claimed in Claim 1, wherein said actuator power source is a pneumatic piston cylinder arrangement.

5. The center stand system as claimed in Claim 1, further comprising a limit switch adapted to switch off said actuator power source as said actuator rod descends by a pre-determined distance, thereby stopping further descend of said actuator rod.

6. The center stand system as claimed in Claim 1, wherein said load bearing mechanism comprising a pair of load bearing members pivotably movable with respect to said base stand and adapted to take a position for receiving the weight of the two-wheeler and ultimately bear the weight of said two-wheeler.
7. The center stand system as claimed in Claim 1, wherein said spring mechanism
is a spring plunger mechanism that has a spring element connected to a
plunger, wherein each set of spring element and plunger is disposed inside a
corresponding cavity configured on said resting plate so that said spring
plunger mechanism urges said pair of load bearing members such as to support
said two-wheeler vehicle and facilitate gradual de-parking of said two-wheeler.

8. The center stand system as claimed in Claim 1, further comprising a spring
element adapted to be compressed to change configuration thereof from a
normal, in tension configuration and a compressed configuration, said spring
element adapted to assist said center stand to move from horizontal position to
vertical position and while the two-wheeler is being de-parked the spring
element is adapted to hold the stand in vertical position till said rods moves
inside the bushings and then allow the base stand and the resting plate to turn
from vertical to horizontal position.

9. The center stand system as claimed in Claim 1, wherein said actuator
mechanism is spaced from said actuator support bracket to facilitate self-
adjustment thereof.

10. The center-stand system as claimed in Claim 1, wherein the actuator
mechanism is a screw actuator.

11. The center-stand system as claimed in Claim 1, wherein the actuator
mechanism is a hydraulic mechanism.

12. The center-stand system as claimed in Claim 1, further comprising an actuator
bracket secured to said actuator support bracket and adapted to provide
additional support to said actuator mechanism supported within said actuator
support bracket.
13. The center-stand system as claimed in Claim 6, wherein said spring mechanism comprises spring elements disposed between both the load bearing members of the load bearing mechanism, said spring elements adapted to facilitate gradual opening of the load bearing mechanism and adapted to prevent the impact of the weight of the two-wheeler coming on the actuator rod when the load bearing mechanism opens.

14. The center-stand system as claimed in Claim 1, wherein said spring mechanism comprises clip spring mounted on the pair of rods such that each clip spring is adapted to be disposed between a corresponding rod and a bushing and adapted to facilitate gradual sliding of the rods, thereby facilitating gradual de-parking of the vehicle when the load bearing mechanism opens, said clip spring further adapted to prevent the impact of the weight of the two-wheeler coming on the actuator rod when the load bearing mechanism opens.

15. The center-stand system as claimed in Claim 1, further comprising a lever mechanism functionally coupled to said load bearing mechanism and adapted to manually open the load bearing mechanism in case the battery fails as said actuator is inoperative in this condition, thereby facilitating manual de-parking of the two-wheeler also.