Support for motorcycles and other two-wheeled vehicles

Support for two-wheeled vehicles, that allows this vehicle, using very limited muscular effort, by sideways, to a small number of degrees, undulations, to be parked securely and stably in such a way that at least one of the wheels of the vehicle is lifted from the ground independently of whether the ground should slope or not. During the undulating movement a number of short leg parts are unfolded successively causing the vehicle to be raised gradually until the different leg parts form a stable support together. Should the ground slope a stable parking position in nevertheless achieved by the unfolding of more leg parts on the side that is located where the ground is lowest.
SUPPORT FOR MOTORCYCLES AND OTHER TWO-WHEELED VEHICLES

It is well known fact that parking a two-wheeled vehicle securely, is connected with great difficulty on almost every occasion. This is particularly hard if the vehicle is heavy, for instance a big motorcycle, and demands great muscular power to pull up on its between the wheels fitted two-legged central support. Another condition for successfully parking the vehicle on its central support is that the ground is almost horizontal. If you do not have the sufficient muscular power, you must rely on the method of trying to pull the vehicle up on its central support with a snatch, which may be successful, but on most occasions will not if the ground is sloping, for instance sideways compared to the vehicle, the vehicle will stand leaning to one side causing the vertical line from the center of gravity to meet the ground close to one of the legs of the central support and since the ability of the vehicle to drive through a curve limits the practical width of the central support, the result is a very unstable parking position on the support.

These difficulties result in a tendency to on almost all occasions rely on the much simpler side stand, that is pulled out to a position inclining downwards from the vehicle, upon which the vehicle is leaning. This side stand, on its half, has the great disadvantage, that the vehicle is leaning heavily, takes up much more space and if the ground is not horizontal, the vehicle has a tendency to roll and fall, in which case, the result is either damage to the vehicle itself or to its surroundings, or both. If a wheel change is needed, its an absolute necessity to park the vehicle on its central support in such a way that the wheel in question can be removed.

Despite this, it is a fact that the central support, even by manufactures of heavy motorcycles very often is omitted because it is considered unnecessary to equip the motorcycle with such a support because most motorcycle drivers lacks sufficient muscular power to operate it.

Described invention is intended to eliminate all the difficulties mentioned above by demanding
a minimum of muscular power to park the vehicle on its central support, making it possible to park the vehicle on sloping ground independently of in which way the ground slopes and guaranteeing that the vehicle always is parked firm and steady. The invention also gives full control of the balance of the vehicle because the invention can be operated while the driver still is positioned astride over the vehicle, and demands only small sideways undulations to park the vehicle on its support. The invention concerns a central support, that in contrast to other constructions, is equipped with one or more spring loaded links, that, when the vehicle is undulated slightly sideways, unfolds successively to a locked position. As only small sideways undulations around the vertical line through the vehicle is required, the invention allows the center of gravity to be kept within the limits of the vertical lines above the two feet of central support, and the vehicle therefore has no tendency to loose its balance. With the invention, more sections are automatically unfolded to a locked position on the lowest side, if the ground should slope in relation to the vertical line of the vehicle, resulting in the center of gravity being kept almost vertically above the central support, which provides stability and prevents the vehicle from falling when parking on a sloping ground.

In following examples, two different design variants, both in which each leg is divided into three parts joined by links, are shown, and where the invention is described with reference to enclosed drawings.

Fig. 1. shows a design variant of the support, shaped, seen from behind, as a symmetrical device, and fig. 2, 3 and 4 shows the same support, seen from the side, in different stages of unfolding. Fig. 5 shows another design variant of the support, shaped, in a frontal view, as a symmetrical device, and fig. 6, 7 and 8 shows the in fig. 5 described support, from the side, with its legs in different stages of unfolding.

This support is attached to the vehicle in the bearings 1, that surrounds the shaft 2. The bearings 1 are, in a known way, attached to the upper part of the support, that consists of
the to each other fixed upper leg parts 4. The shaft 2 is connected to the vehicle, and thereby allowing the support to be pivoted. When the support is pivoted upwards, it is fixed in this position, in a known way, by spring 3, that is attached in such a way that it will also keep the support in a fixed position when pivoted downwards. Spring 3, as well as all other in the invention included springs, in the figures shown as tension springs, can also be configurated as torque springs, or another suitable type of spring. The bearings 1, surrounds the shaft 2, which is perpendicular to the longitudinal axis of the vehicle. The support has two legs, here consisting of the two upper, to each other fixed leg parts 4, the middle leg parts 5, and the lower leg parts 6. The leg parts 5 and 6 are equipped with ground plates 7 and 8 that prevents them from cutting through soft ground. This support is on each of the upper legparts 4 equipped with a foot operated lever 9, to be used when lowering the support against the ground and during this operation, the middle leg parts 5 and lower leg parts 6 are folded backwards. The leg part 5 is by the link 10 flexibly connected to leg part 4. The leg part 6 is by the link 11 flexibly connected to leg part 5. The leg part 5 is by a spring 12 thightened against leg part 4. The link 10 is positioned outside of the contact surfaces 14 and 15 in such a way that, when these contact surfaces are in touch with one another, the leg parts 4 and 5 are more firmly locked together as more load is stressed upon them. The attachment device 1 and 2, working as link for each other fixed leg parts 4, and the link 10 and 11, are all located on the same side, outside of the leg part itself, and more or less parallel to each other or the bisector of the leg parts if the leg parts are inclined laterally in relation to each other. The spring 3, that holds the upper leg part 4, is strong enough, in relation to spring 12 and spring 13 and attached in such a way, that it is able to, in a known way, keep the leg part 4 fixed in a lowered position when the leg parts 5 and 6 touches the ground, before the contact surfaces 14 and 15 together with 16 and 17 have made contact. As the vehicle is leaned sideways, leg part 5 will by spring
12 that is stronger than spring 13, be pulled forward to allow the contact surfaces 14 and 15 to meet on the side of the support that is lifted. The leg parts 4 and 5 now forms a solid support for the vehicle. When the vehicle is leaned to the other side, the same procedure will be repeated for the leg part 5 then lifted. Spring 12 that holds leg part 5 is stronger than spring 13 and attached in such a way that it will be able to keep leg part 5 in lowered position when leg part 6 touches the ground. As the vehicle once is leaned to the first side, spring 13 will pull leg part 6 forward causing the contact surfaces 16 and 17 to meet and this will be repeated on the opposite side when the vehicle is again leaned to the other side. With the use of only the smallest muscular effort, a support, high enough to allow the vehicle to be parked firmly and securely and permitting work to be performed on the wheels of the vehicle has now been lowered. Fig. 3 shows the support in a position with one leg part 6 still touching the ground and with leg parts 4 and 5 lowered to stable position. Fig 4 shows the support in a completely lowered position. Fig 5 shows a different configuration of the support, though working according to the same principle, in a frontal view as a symmetrical device, where the leg parts 19 and 20 has been attached to the same shaft 21. Fig. 6, 7 and 8 shows the support from the side in different stages of unfolding. Similarly to the earlier described configuration variant, also in case the links of the leg parts are positioned outside of the contact surfaces 25 and 26 together with 24 and 25 in such a way that, when these contact surfaces are in touch with one another, the leg parts 18, 19 and 20 are more firmly locked together as more load is stressed upon them. When the vehicle is undulated sideways the same events take place as described for the first variant and here shown in fig. 6, 7 and 8. When the support is lowered, the upper leg part 18 is kept in position by spring 22. When the vehicle is leaned, leg part 19 on the side that is lifted will be pulled forward by spring 23, until its contact surface 27 hits the stopping
knob 24. As the vehicle is leaned to the other side the procedure will be repeated on the opposite side. When the vehicle once again is leaned to the first side, spring 24 will pull leg part 20 forwards, causing contact surfaces 25 and 26 to meet. This procedure is repeated for the opposite side when the vehicle is leaned in the other direction once again. The springs are here described as tension springs but can be torque springs plate springs or another suitable type of spring, with equal function. With the use of only the smallest muscular effort, a support high enough to allow the vehicle to be parked firmly and securely has now been lowered.

Fig. 1 shows a configuration variant of the support from behind. Fig. 2 shows the same support lowered to its first position where all but the upper leg part are folded back.

Fig. 3 shows the same support lowered partly in such a way that the middle part is stably connected to the upper leg part and the lower leg part is still pointing backwards and resting on the ground.

Fig. 4 shows the same support completely lowered to a stable and secure position.

Fig. 5 shows a different configuration variant of the support from the front.

Fig. 6 shows the same construction variant lowered to its first position where all but the upper leg part are folded back.

Fig. 7 shows the same construction variant lowered partly in such a way that middle leg part is stably connected to the upper leg part and the lower leg part is still pointing backwards and resting on the ground.

Fig. 8 shows the same construction variant completely lowered to stable and secure position.

In following examples two different configurations of variant with each leg divided into three linked parts and where the invention is described with reference to enclosed drawings.

Fig. 1 shows a variant of the support configured as symmetrical devise from behind and fig. 2, 3 and 4 shows the same support from the side in different stages of unfolding.

Fig. 5 shows another variant of the support configured as a
symmetrical devise seen from the front and fig. 6, 7 and 8 shows the same support as in fig. 5 from the side in different stages of unfolding.
Patent claims.

1. Support for two-wheeled vehicle in which every supporting leg is divided into, to each other by links connected smaller leg parts and where every leg part successively, by small sideways undulation, alternately is unfolded to a locked position causing at least one of the wheels of the vehicle to be lifted from the ground independently of whether the ground should slope or not, characterized in that every leg part (4, 5, 6 and 18, 19, 20) is arranged in such a way that when it is unfolded, it moves in a plane that more or less coincides with the plane formed by the movements of the other leg parts and that this plane more or less is parallel to the vertical axis and longitudinal axis of the vehicle.

2. Support for two-wheeled vehicle according to patent claim 1 characterized in that every leg part (4, 5, 6 and 18, 19 and 20) is journalled on the same side, outside of the common symmetry line of the different leg parts.

3. Support for two-wheeled vehicle according to patent claims 1 and 2 characterized in that each of the different leg parts (4, 5, 6 and 18, 19 and 20) is flexibly connected through a, for each of the leg parts separate, attached bearing (21, 10 11) or that these bearings, depending on the number of leg parts, have a common shaft or they can be located in groups.

4. Support for two-wheeled vehicle according to patent claims 1 to 3 characterized in that a spring is attached to each of the leg parts and that spring (3) of the upper leg part (4) is stronger than spring (12) attached to the of the under this leg part located leg part (5), which in its turn is stronger than the further down located spring (13) attached in its lower part to leg part (6), this implying that every spring attached to a further down located leg part always is weaker than the immediately above located spring, independent of the number of leg parts.

5. Support for two-wheeled vehicle according to patent claims 1 to 4 characterized in that each leg part (4, 5, 6 and 18, 19, 20) is connected to a spring to tension, torque or another type, that it will work to pull the lower located leg part against the upper one in such a way that a stably locked position is achieved when the symmetry axes of both leg parts generally
concides and the leg parts are subject to a force that mainly acts along the symmetry axis.
INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 02/00004

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B62H 1/04, B62H 1/06
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B62H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>US 5388848 A (SILVA ET AL.), 14 February 1995 (14.02.95)</td>
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<td>A</td>
<td>US 4582336 A (ONODA), 15 April 1986 (15.04.86)</td>
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Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents
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