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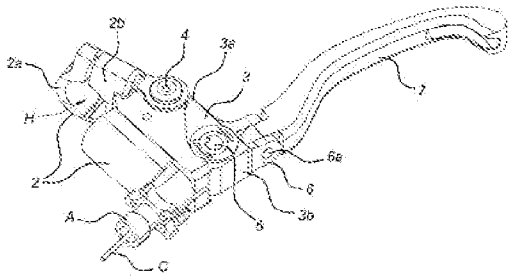
(54) **Lever assist system for a motorcycle**

(57) Een hendelhulpsysteem (1) voor het bedienen van een koppelings- of een remsysteem van een motorfiets, omvattende een behuizingsdeel (2) dat is ingericht voor montage op een stuur van een motorfiets; en een basisdeel (3) met een eerste basisuiteinde (3a) dat draaibaar is verbonden met het behuizingsdeel (2) om een hoofdscharnierpunt (4) daarvan tussen een neutrale positie (P1) en een bedieningspositie (P2), en een tweede basisuiteinde (3b) voorverbinding met een koppelings- of remsysteem van een motorfiets en voor verbinding met een handmatig bedienbaar hendeldeel (7). Het hendelhulpsysteem (1) omvat verder een tuimeldeel (8) dat draaibaar is gemonteerd en in rotatievoorspanning is aangebracht op het behuizingsdeel (2) om een secundair scharnierpunt (4a) daarvan. Het basisdeel (3) omvat een volgerdeel (10) dat in aangrijping is met het tuimeldeel (8), waarbij de aangrijping tussen het volgerdeel (10) en het tuimeldeel (8) rotatie van het basisdeel (3) assisteert in de bedieningspositie (P2).



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Lever assist system for a motorcycle

Field of the invention

The present invention relates to a lever assist system for a motorcycle, particularly a lever assist system for operating a clutch or brake system on a motorcycle.

Background art

International application WO 2007/128058 A1 discloses a device to both reduce the effort involved to actuate a vehicles clutch. The device comprises a lever actuated by the operator that simultaneously rotates two profiled cam surfaces around a single pivot, one of which actuates the clutch via a cam follower bearing, a pivoted actuating arm and a hydraulic master cylinder while the other varies the tension or compression of a spring also via a cam follower bearing and a pivoted actuation arm. The profiled cam that varies the energy stored in the spring can be used to vary the assistance this system offers the operator whilst actuating the clutch.

The device of the abovementioned prior art utilizes rather large cam profiles that rotate in unison with the lever about a main pivot point thereof, as a result of which the device, particularly the lever, becomes bulky and exhibits reduced aerodynamics when mounted on a handlebar of a motorcycle. The spring of the device for assisting the lever protrudes in a direction substantially parallel to said lever and inward with respect to a motorcycle handlebar on which the device may be mounted, so that the spring can interfere with switch gear mounted on the handlebar adjacent to the device.

Summary of the invention

The present invention seeks to provide an improved lever assist system for a motorcycle, particularly a lever assist system for operating a clutch or brake system on a motorcycle. The lever assist system is compact and provides improved aerodynamics, which is particularly advantageous for racing purposes. Furthermore, the lever assist system of the present invention is particularly suited as an aftermarket product to be fitted on a handlebar of a motorcycle.

According to the present invention, a lever assist system as mentioned in the preamble is provided, comprising a housing member configured for being mounted on a handlebar of a motor cycle, a rotatable base member having a first base end which is pivotally connected to the housing member about a main pivot point thereof between a neutral position and an actuated position, and a second base end comprising a first connecting portion configured for connection to the clutch or brake system of a motorcycle. The base member further comprises a second connecting portion for connection to a lever member, which is manually operable. The lever assist system further comprises a rotatable rocker member which is pivotally mounted and rotationally biased on the housing member about a secondary pivot point thereof, wherein the rocker member comprises a first rocker end provided with a main cam surface. The base member further comprises a follower member in engagement with the main cam surface, and wherein the engagement between the main cam surface and the follower member is configured to rotationally

assist the base member in the actuated position thereof, e.g. when pulling the lever member in the actuated position.

According to the present invention, pulling the lever member rotates the base member from a neutral position, i.e. when the base member is in rest, to an actuated position of the base member. The neutral position of the base member represents an unactuated state of the clutch or brake system, whereas the actuated position of the base member represents an actuated state of the clutch or brake system. As the follower member is able to move along the main cam surface during rotation of the base member, the rotationally biased rocker member imposes a biasing force on the follower member such that rotational assistance to the base member is provided. As a result, pulling the lever member for actuating the clutch or brake system requires considerable less manual effort and allows for improved manual modulation of the lever member and tactile feedback thereof. This in turn allows for precise control over the clutch or brake system when pulling the lever member and this is particularly advantageous for racing purposes, e.g. when gear shifts or brake events occur fast and in short succession of one another.

The rocker member with the main cam surface in engagement with the follower member of the base member provides for a compact design of the lever assist system, thereby allowing the lever assist system to be used as an aftermarket product to be conveniently mounted on a handlebar in close proximity of e.g. existing switch gear.

In an exemplary embodiment, the base member comprises a slot through which the rocker member moveably extends. In this embodiment the rotatable base member is provided with a slot in which the rocker member is receivable and able to rotate for engaging the follower member, thereby providing assistance to the base member upon pulling the lever member. As the rocker member is received in the base member further reduces the overall dimensions of the lever assist system with corresponding aerodynamic improvements and the ability to conveniently mount the lever assist system close to switch gear on a handlebar.

In a further embodiment, the follower member laterally extends through the slot, further minimizing dimensions of the base member. In this embodiment, the follower member may be fully received in the slot and as such the follower member cannot interfere with other components on a handlebar.

In an exemplary embodiment, the rocker member comprises a second rocker end opposite the first rocker end, wherein the secondary pivot point is arranged between the first and second rocker end, and wherein the housing member comprises an actuator member which is movably arranged along a longitudinal axis thereof and wherein the actuator member is in biased engagement with the second rocker end. This embodiment allows for a linear biasing force to be imposed on the second rocker end through biased linear motion of the actuator member along its longitudinal axis. The first rocker end then imposes a biasing force on the follower member where the main cam surface engages the follower member. Then to make the lever assist system even more compact, in a further embodiment the base member may be arranged substantially parallel to the longitudinal axis of the actuator member when the base member is in the neutral position.

Short description of drawings

The present invention will be discussed in more detail below, with reference to the attached drawings, in which

Figure 1 shows a three dimensional view of a lever assist system according to an embodiment of the present invention;

Figure 2 shows a another three dimensional view of lever assist system according to an embodiment of the present invention.

Figure 3 shows a cross section of a lever assist system in a neutral position according to an embodiment of the present invention; and wherein

Figure 4 shows a cross section of a lever assist system in an actuated position according to an embodiment of the present invention.

Description of embodiments

Figure 1 and 2 each show a three dimensional view of a lever assist system 1 according to an embodiment of the present invention, wherein Figure 3 shows a cross section of a lever assist system 1 according to an embodiment of the present invention.

In the embodiments shown, the lever assist system 1 for use on a handlebar (not shown) of a motorcycle comprises a housing member 2 which is configured for being mounted on a handlebar. In an embodiment, the housing member 2 may comprise two clamp parts/shells 2a, 2b by which the housing member 2 can be clamped on a handlebar and affixed thereto. The two clamp part 2a, 2b define an adjustable through bore H for receiving a tubular handlebar, wherein the two clamp parts 2a, 2b may be tightened and pulled together for clamping the housing member 2 to the handlebar.

The lever assist system 1 comprises a rotatable base member 3 having a first base end 3a that pivotally connects to the housing member 2 about a main pivot point 4 thereof between a neutral position and an actuated position (to be explained further below). The base member 3 further comprises a second base end 3b that comprises a first connecting portion 5 configured for connection to a clutch or brake system of a motorcycle. In the exemplary embodiments shown, the first connecting portion 5 may be configured for connection to a cable C of a clutch or brake system. In an alternative embodiment, the first connecting portion 5 may be configured for connection to a master cylinder (not shown) of a hydraulic clutch or brake system. As depicted, in an embodiment the housing member 2 may be provided with a cable adjuster A for removing any slack from the cable C and to ensure that the cable C is sufficiently tightened for proper operation of the clutch or brake system when the base member 3 pivots about the main pivot point 4, e.g. in counter clockwise direction as suggested in the figures.

The base member 3 further comprises a second connecting portion 6 for connection to a manually operable lever member 7, wherein the lever member 7 can be operated by pulling the lever member 7 such that the base member 3 pivots about the main pivot point 4. During rotation of the base member 3, the cable C actuates the clutch or brake system. In an advantageous embodiment, the second connecting portion 6 may comprise a releasable lever connector 6a for

changing the lever member 7 should the need arise for e.g. ergonomic purposes. In another embodiment the base member 3 and the lever member 7 form a single piece component, e.g. cast or machined.

As depicted in Figure 2 and 3, the lever assist system 1 comprises a rotatable rocker member 8 which is pivotally mounted on the housing member 2 and rotationally biased with respect thereto, e.g. in clockwise direction as shown, about a secondary pivot point 4a of the housing member 2. It is noted that in Figure 2 the housing member 2 and cable adjusters A are not shown, so that internals of the housing member 2 become visible. The rocker member 8 further comprises a first rocker end 8a which is provided with a main cam surface 9.

The base member 3 is further provided with a follower member 10 which is in engagement with the main cam surface 9, and wherein the engagement between the main cam surface 9 and the follower member 10 is configured to rotationally assist the base member 3 in an actuated position P2 thereof as depicted in Figure 4.

According to the present invention, pulling the lever member 7 rotates the base member 3 from a neutral position, representing an unactuated state of the clutch or brake system, to an actuated position of the base member 3, representing an actuated state of the clutch or brake system. Figure 3 shows an embodiment of the lever assist system 1, and in particular the base member 3, in the neutral position P1, whereas Figure 4 shows an embodiment of the lever assist system 1, in particular the base member 3, in the actuated position P2.

As the follower member moves 10 along the main cam surface 9 during rotation of the base member 3 in the direction D as depicted in Figure 3, the rotationally biased rocker member 8 imposes a biasing force on the follower member 10 such that rotational assistance to the base member 3 is provided. The rotational assistance reduces the manual force required when pulling the lever member 7, thereby facilitating modulation and improving tactile feedback of the lever assist system 1 in demanding applications such as racing, e.g. when gear shifts or brake events occur in short succession of one another, where a light, short squeeze of the lever member 7 can be sufficient to bring the brake member 3 in the actuated position P2.

It is worth noting that the actuated position P2 of the base member 3 and the lever member 7 as depicted in Figure 4 does not represent a single, fixed level of clutch or brake system actuation when operating the lever assist system 1. As will be understood by a skilled person in the art, increasing the counter clockwise rotation of the base member 3 by pulling the lever member 7 intensifies the actuation of the clutch or brake system to a higher level. Therefore, the actuated position P2 of the base member 3 as shown in Figure 4 represents a particular intensity of clutch or brake actuation for a given rotation of the base member 3 as measured from the neutral position P1. Here, the neutral position P1 may be understood as a position of the base member 3 when the lever member 7 is in rest and without manual input.

In an embodiment, the base member 3 may comprise a slot 3c through which the rocker member 8 moveably extends. In this embodiment the rotatable rocker member 8 is provided with a slot 3c in which the rocker member 8 is receivable and able to rotate for engaging the follower member 10, thereby providing rotational assistance to the base member 3 upon pulling the lever

member 7. Since the rocker member 8 is received in the base member 3 allows for a further size reduction of the lever assist system 1. In a further embodiment, the follower member 10 laterally extends through the slot 3c, so that the size of the base member 3 is minimized. In this embodiment the follower member 10 may be seen as being fully arranged in the slot 3c and as such the follower member 10 cannot interfere with other components on a handlebar.

In an advantageous embodiment, the follower member 10 comprises a rotatable roller part 10a in rolling/rollable engagement with the main cam surface 9. The rotatable roller part 10a reduces friction and provides for smooth motion of the follower member 10 along the main cam surface 9. In a particular embodiment the rotatable roller part 10a is journaled for rotation by means of a bearing to minimize friction.

As further depicted in Figure 3 and 4, in an embodiment the main cam surface 9 may comprise a neutral surface portion 9a in biased engagement with the follower member 10 when the base member 3 is a neutral position P1 thereof, and an actuating surface portion 9b in biased engagement with the follower member 10 for rotationally assisting the base member 3 in an actuated position P2 thereof, wherein the neutral surface portion 9a and the actuating surface portion 9b have different surface curvatures. In this embodiment, the neutral surface portion 9a comprises a surface curvature different from a surface curvature of the actuating surface portion 9b, so that different levels of rotational assistance of the base member 3 and the lever member 7 can be provided over a particular range of rotation of the base member 3.

For example, the neutral surface portion 9a may be configured to maintain the base member 3 and lever member 7 in the neutral position P1 as long as the lever member 7 is not operated. So in the neutral position P1 the neutral surface portion 9a provides no discernible rotational assistance to the base member 3 when in engagement with the follower member 10. The actuating surface portion 9b on the other hand may be configured to provide rotational assistance when the lever member 7 is in the actuated position P2 when pulled.

In an exemplary embodiment, the neutral surface portion 9a may be a straight surface portion 9a arranged substantially perpendicular to a straight force line F extending from the main pivot point 4 to the straight surface portion 9a when the base member 3 is in the neutral position P1, and wherein the actuating surface portion 9b is an arched surface portion 9b. In this embodiment it is seen that the straight surface portion 9a does not contribute to rotational assistance of the base member 3 as no discernible moment can be applied along the straight force line F in the neutral position P1. On the other hand, in the actuated position P2 of the base member 3, the arched surface portion 9b is able to impose a moment on the base member 3 through the engagement with the follower member 10.

It is worth noting that the neutral position P1 may be seen as a relatively small rotational/angular range of the base member 3 in which the main cam surface 9 does not contribute any discernible rotational assistance to the base member 3. For example, the neutral surface portion 9a may have a length such that the follower member 10 is able to move along the neutral surface portion 9a through rotation of the base member 3 yet no discernible assistance is yet provided. Once the base member 3 rotates over a sufficient angular distance, e.g. in counter

clockwise direction as depicted, then the follower member 10 approaches the actuating position P2. At that moment the follower member 10 starts engaging the arched surface portion 9b and as such rotational assistance to the base member 3 and the lever member 7 is provided.

As mentioned earlier, the lever assist system 1 comprises the rotatable rocker member 8 which is pivotally mounted on the housing member 2 and rotationally biased with respect thereto. The rocker member 8 comprises the first rocker end 8a which is provided with the main cam surface 9, wherein the main cam surface 9 is in engagement with the follower member 10 and allows the lever member 7 to be rotationally assisted when manually operated.

Rationally biasing the rocker member 8 on the housing member 2 may be achieved with an embodiment wherein the rocker member 8 comprises a second rocker end 8b opposite the first rocked end 8a, wherein the secondary pivot point 4a is arranged between the first and second rocker end 8a, 8b. The housing member 2 then comprises an actuator member 11 which is movably arranged along a longitudinal axis L thereof and in biased engagement with the second rocker end 8b. This embodiment allows for a linear biasing force to be imposed on the second rocker end 8b through biased linear motion of the actuator member 11 along the longitudinal axis L. As shown in Figure 3, as the actuator member 11 imposes an upward biasing force B on the second rocker end 8b allows the first rocker end 8a to impose a downward biasing force on the follower member 10 where the main cam surface 9 engages the follower member 10.

Furthermore, since both the first rocker end 8a and the follower member 10 may be arranged in a slot 3c of the base member 3, the second rocker end 8b may protrude from the slot 3c to allow for engagement with the actuator member 11. This further reduces the size of the lever assist system 1.

In an embodiment, the second rocker end 8b comprises an arched secondary cam surface 12 for engagement with the actuator member 11. The arched secondary cam surface 12 allows the second rocker end 8b to smoothly pivot and follow the linearly moveable actuator member 11 when the base member 3 rotates upon manual operation of the lever member 7.

It is worth noting that in an alternative embodiment (not shown) it is conceivable that the second rocker end 8b may comprises a rotatable rocker wheel for engagement with the actuator member 11. Such a rotatable rocker wheel would further reduce friction between the actuator member 11 and the second rocker end 8b when the actuator member 11 moves and the rocker member 8 pivots about the secondary pivot point 4a in response.

According to the present invention, the lever assist system 1 provides for a compact design that can be easily fitted as an aftermarket product and as such the lever assist system 1 should not interfere with existing switch gear on a handlebar, for example. To that end further advantageous embodiments are conceivable to achieve a compact design for the lever assist system 1.

With reference to Figure 2 and 3, an embodiment is provided wherein the base member 3 is arranged substantially parallel to the longitudinal axis L of the actuator member 11 when the base member 3 is in the neutral position P1. That is, in this embodiment the actuator member 11 is longitudinally aligned, in a side-by-side fashion, with the base member 3 in the neutral position

P1. As a result, the lever assist system 1 becomes very compact and minimizes the number of protruding components on the handlebar that could potentially interfere with handlebar component such as existing switch gear and the like.

In view of this embodiment, the base member 3 may have a substantially rectangular shape of which the two shortest opposing sides comprise the first and second base ends 3a, 3b. When the base member 3 is in rest, i.e. in the neutral position P1, then the rectangular shaped base member 3 is able to align in lengthwise fashion, side-by-side, with the longitudinal axis L of the actuator member 11. So in this embodiment the base member 3 is a rectangular shaped base member 3 which is arranged in lengthwise fashion substantially parallel to the longitudinal axis L of the actuator member 11 when the base member 3 is in the neutral position P1. This allows for a very compact design of the lever assist system 1. In a further embodiment, a side surface of the rectangular shaped base member 3 may be provided with the slot 3c in which the first rocker end 8a is receivable and through which the follower member 10 extends laterally.

As mentioned earlier, the actuator member 11 may be arranged in the housing member 2 and wherein the actuator member 11 is linearly movable along its longitudinal axis L. The actuator member 11 may then configured for biased engagement with the second rocker end 8b, wherein the biased engagement is transferred through rotation about the secondary pivot point 4a to the first rocker end 8a. In turn, the first rocker end 8a then biases against the follower member 10 to allow for rotational assistance in the actuated position P2 of the base member 3 and the lever member 7.

The biased engagement provided by the actuator member 11 may be provided through an embodiment wherein the housing member 2 further comprises a spring member 13 arranged along the longitudinal axis L and wherein the spring member 13 is in resilient engagement with the actuator member 11. In this embodiment the resilient spring member 13 ensures that a biasing force is constantly applied to the actuator member 11 in a direction along the longitudinal axis L. This biasing force is then responsible for a constantly applied biasing engagement between the main cam surface 9 and the follower member 10.

As depicted, in an exemplary embodiment the spring member 13 may be a helical spring member, e.g. a linearly/longitudinally expanding and contracting spring member 13, concentrically arranged with respect to the actuator member 11 and the longitudinal axis L thereof. This ensures a biasing force along the longitudinal axis L acting on the actuator member 11.

In an embodiment, the actuator member 11 comprises a protruding base portion 11a extending into the spring member 13, e.g. the helical spring member, so that the actuator member 11 remains concentrically arranged with the spring member 13 when subjected to the biasing force imposed thereby.

It is worth noting that in an alternative embodiment it is conceivable that the rotatable rocker member 8 is rotationally biased on the housing member 2 about the secondary pivot point 4a by means of a torsion spring. For example, the housing member 2 may comprise a torsion spring (not shown) which is arranged to rotationally bias the rocker member 8 about the secondary pivot point 4a. Such a torsion spring may, but need not, be arranged around the

secondary pivot point 4a. Utilizing a torsion spring would also allow for a compact lever assist system 1. Moreover, it is even conceivable that such a torsion spring could be used in conjunction with the actuator member 11 and the spring member 13, e.g. a linearly/longitudinally expanding and contracting spring member 13.

In an advantageous embodiment, the actuator member 11 may be a tubular actuator member 11 comprising a bottom surface 11b in engagement with the second rocker end 8b, e.g. with the arched secondary cam surface 12, and further comprising a circumferential wall 11c extending from the bottom surface 11b, and wherein the circumferential wall 11c is slidably arranged in the housing member 2. In this embodiment the tubular actuator member 11 may be seen as having a blind bore that terminates at the bottom surface 11b. The tubular shape of the actuator member 11 is advantageous in that the biasing force imposed thereon, e.g. through the spring member 13, cannot rotate/tilt the tubular actuator member 11 sideways in the housing member 2 and as such the tubular actuator member 11 remains limited to linear movement along the longitudinal axis L in the housing member 2.

In an embodiment, the circumferential wall 11c comprises a longitudinal slit 11d through which the rocker member 8 extends. In this embodiment the circumferential wall 11c of the tubular actuator member 11 comprises the slit 11d to allow the rocker member 8, and in particular the second rocker end 8b thereof, to be received through the slit 11d so that the second rocker end 8b is able to engage the bottom surface 11b in a shortest distance from the secondary pivot point 4a. The slit 11d may be slightly wider than a width of the rocker member 8, allowing the circumferential wall 11c to maintain sideways/lateral stability along the circumference of the actuator member 11 within the housing member 2.

As the actuator member 11 may be slidably/slidingly arranged in the housing member 2, care must be taken that the housing member 2 does not wear or becomes damaged when the actuator member 11 engages the housing member 2. To that end an embodiment is provided wherein the housing member 2 comprises a tubular bushing member 14, i.e. fixed in the housing member 2, in which the actuator member 11 is linearly movably. As the actuator member 11 slidably engages the bushing member 14, the housing member 2 is not subjected to wear. This is particularly advantageous when the housing member 2 is made of a relatively soft piece of aluminium, for example. The bushing member 14 then prevents wear of the aluminium housing member 2.

From Figure 3 and 4 it can be seen that in an embodiment both the actuator member 11 with circumferential wall 11c and the spring member 13 may be arranged in the tubular bushing member 14. This allows for lateral stability of the actuator member 11 and the spring member 13 but also prevents excessive wear of the housing member 2 during sliding motion of the actuator member 11 and the spring member 13 along the bushing member 14.

As mentioned previously, the base member 3 may be arranged substantially parallel to the longitudinal axis L of the actuator member 11 when the base member 3 is in the neutral position P1, thereby providing for a very compact design of the lever assist system 1 so that it can

be easily mounted on a handlebar without interfering with existing hardware on the handlebar such as switchgear, handlebar grips and the like.

Referring to Figure 3, another way to characterize how the actuator member 11 and the base member 3 may be aligned in the neutral position P1 is through an embodiment wherein an alignment angle α between the longitudinal axis L of the actuator member 11 and a longitudinal axis K of the base member 3 lies between 0° and 90° degrees when the base member 3 is in the neutral position P1. Here, the longitudinal axis K of the base member 3 extends through the main pivot point 4 and the first connecting portion 5 of the base member 3. [claim 15]

As will be understood, since the base member 3 is rotatable about the main pivot point 4, the longitudinal axis K of the base member 3 will rotate in unison with the base member 3 about the main pivot point 4 as the first connecting portion 5 rotates in unison with the base member 3 upon pulling the lever member 7. It is also important to note that the alignment angle α is measured/defined in a plane perpendicular to a pivoting axis Y of the main pivot point 4 as shown in Figure 2.

When the above defined alignment angle α lies between 0° and 90° degrees provides for a compact arrangement of the actuator member 11 and the base member 3 and as such the lever assist system 1, thereby allowing convenient mounting on a handlebar without interfering with existing hardware also mounted thereon (switchgear, grip sleeves and the like).

Decreasing the alignment angle α provides for a further size reduction of the lever assist system 1 by virtue of a more compact arrangement of the actuator member 11 and the base member 3. For example, in a further embodiment the alignment angle α is more preferably between 0° and 45° degrees, bringing the longitudinal axis L of the actuator member 11 and the longitudinal axis K of the base member 3 closer toward a parallel arrangement and thus a more compact arrangement of the actuator member 11 and the base member 3.

In an even further embodiment, the alignment angle α is most preferable between 0° and 25° degrees, bringing the longitudinal axis L of the actuator member 11 and the longitudinal axis K of the base member 3 even closer toward a parallel arrangement and thus an even more compact arrangement of the actuator member 11 and the base member 3.

In an exemplary embodiment, the alignment angle α is substantially 0° degrees, so that the longitudinal axis L of the actuator member 11 and the longitudinal axis K of the base member 3 are substantially parallel and as such provide for an optimized compact arrangement of the actuator member 11 and the base member 3, hence making the lever assist system 1 even more compact.

As depicted in the exemplary embodiment of Figure 3, the actuator member 11 may be in engagement with the spring member 13, wherein the spring member 13, e.g. a helical spring member, is concentrically arranged with the actuator member 11 along the longitudinal axis L thereof. Therefore, by providing the spring member 13 and the actuator member 11 in alignment with the longitudinal axis K of the base member 3 in the neutral position P1 provides for a compact and easy to mount lever assist system 1 when the alignment angle α is between 0° and

45° degrees, more preferably between 0° and 25° degrees, and most preferably between 0°and 10° degrees, or even substantially 0°degrees.

In addition to the alignment angle α, it is possible to limit the height or thickness of the lever assist system 1 as measured in a direction along the aforementioned pivoting axis Y of the main pivot point 4 as shown in Figure 2. Here, the pivoting axis Y defines an axis about which the base member 3 is pivotally arranged between the neutral and actuating positions P1, P2.

As shown in Figure 2, an embodiment may be provided wherein the longitudinal axis K of the base member 3 and the longitudinal axis L of the actuator member 11 are spaced apart between 0 mm and 30 mm over an offset distance P as measured along the pivoting axis Y of the main pivot point 4. [claim 16] In this embodiment, the actuator member 11 and the base member 3 may be offset over a maximum distance of 30 mm in the direction of the pivoting axis Y. In this way the height or thickness of the lever assist system 1 is limited and minimized so that a compact design is achieved as mentioned earlier.

In a preferred embodiment, the offset distance P between the longitudinal axis K of the base member 3 and the longitudinal axis L of the actuator member 11 is between 0 mm and 10 mm, thereby further limiting the thickness and thus the overall dimensions of the lever assist system 1.

In a most preferred embodiment, the offset distance P between the longitudinal axis K of the base member 3 and the longitudinal axis L of the actuator member 11 is substantially 0 mm, i.e. there is no discernible offset between the axes L, K along the pivoting axis Y. In this particular embodiment, when a clutch or brake cable C is connected to the first connecting portion 5 of the base member 3, then the longitudinal axis L of the actuator member 11 intersects the cable C at the depicted intersection point X. In this way the actuator member 11, the base member 3 and the lever member 7 extend along and lie in a common plane, i.e. a plane defined by the longitudinal axes L, K with zero offset distance P. This in turn provides for a compact design of the lever assist system 1 with a minimized thickness in the direction of the pivoting axis Y.

As discussed above, the lever assist system 1 allows for reduced manual pulling forces on the lever member 7 when operating a clutch or brake system. This is achieved through a pivotally mounted and rotationally biased rocker member 8 acting on the follower member 10 mounted on the rotatable base member 3. To minimize rotational resistance of the base member 3, an embodiment is provided wherein the first connecting portion 5 of the base member 3 comprises a rotatable, journaled cable connector 15 for connecting a clutch or brake cable C. In this embodiment the cable connector 15 is rotationally arranged in the base member 3 by means of a radial bearing, for example, to allow the cable connector 15 to follow rotation of a cable end E of the cable C attached to the cable connector 15.

As seen from Figure 3 and 4, since the base member 3 is able to move between the neutral and actuating positions P1, P2, the cable C does not change its direction as it extends through a cable adjuster A attached to the housing member 2. So when the base member 3 rotates about the main pivot point 4, the cable connector 15 is able to rotate smoothly with

minimal friction in unison with the cable end E as it maintains the orientation of the cable C through the cable adjuster A.

In view of the above, the present invention can now be summarised by the following embodiments:

Embodiment 1. A lever assist system (1) for operating a clutch or a brake system of a motorcycle, comprising a housing member (2) configured for being mounted on a handlebar of a motorcycle;

a rotatable base member (3) having a first base end (3a) pivotally connected to the housing member (2) about a main pivot point (4) thereof between a neutral position (P1) and an actuated position (P2), and a second base end (3b) comprising a first connecting portion (5) configured for connection to a clutch or brake system of a motorcycle, and wherein the base member (3) comprises second connecting portion (6) for connection to a manually operable lever member (7);

wherein the lever assist system (1) further comprises a rotatable rocker member (8) pivotally mounted and rotationally biased on the housing member (2) about a secondary pivot point (4a) thereof, wherein the rocker member (8) comprises a first rocker end (8a) provided with a main cam surface (9),

wherein the base member (3) comprises a follower member (10) in engagement with the main cam surface (9), and wherein the engagement between the main cam surface (9) and the follower member (10) is configured to rotationally assist the base member (3) in the actuated position (P2).

Embodiment 2. The lever assist system according to embodiment 1, wherein the base member (3) comprises a slot (3c) through which the rocker member (8) moveably extends.

Embodiment 3. The lever assist system according to embodiment 2, wherein the follower member (10) laterally extends through the slot (3c).

Embodiment 4. The lever assist system according to any one of embodiments 1 -3, wherein the follower member (10) comprises a rotatable roller part (10a) in rollable engagement with the main cam surface (9).

Embodiment 5. The lever assist system according to any one of embodiments 1-4, wherein the cam surface (9) comprises a neutral surface portion (9a) in biased engagement with the follower member (10) when the base member (3) is in the neutral position (P1), and an actuating surface portion (9b) in biased engagement with the follower member (10) for rotationally assisting the base member (3) in the actuated position (P2), and wherein the neutral surface portion (9a) and the actuating surface portion (9b) have different surface curvatures.

Embodiment 6. The lever assist system according to embodiment 5, wherein the neutral surface portion (9a) is a straight surface portion (9a) arranged substantially perpendicular to a straight force line (F) extending from the main pivot point (4) to the straight surface portion (9a) when the base member (3) is in the neutral position (P1), and wherein the actuating surface portion (9b) is an arched surface portion (9b).

Embodiment 7. The lever assist system according to any one of embodiments 1-6, wherein the rocker member (8) comprises a second rocker end (8b) opposite the first rocker end (8a), wherein the secondary pivot point (4a) is arranged between the first and second rocker end (8a, 8b), and wherein the housing member (2) comprises an actuator member (11) movably arranged along a longitudinal axis (L) thereof and in biased engagement with the second rocker end (8b).

Embodiment 8. The lever assist system according to embodiment 7, wherein the second rocker end (8b) comprises an arched secondary cam surface (12) for engagement with the actuator member (11).

Embodiment 9. The lever assist system according to embodiment 7 or 8, wherein the base member (3) is arranged substantially parallel to the longitudinal axis (L) of the actuator member (11) when the base member (3) is in the neutral position (P1).

Embodiment 10. The lever assist system according to any one of embodiments 7-9, wherein the housing member (2) further comprises a spring member (13) arranged along the longitudinal axis (L) and wherein the spring member (13) is in resilient engagement with the actuator member (11).

Embodiment 11. The lever assist system according to embodiment 10, wherein the actuator member (11) comprises a protruding base portion (11a) extending into the spring member (13).

Embodiment 12. The lever assist system according to any one of embodiments 7-11, wherein the actuator member (11) is a tubular actuator member comprising a bottom surface (11b) in engagement with the second rocker end (8b), and wherein the actuator member (11) comprises a circumferential wall (11c) extending from the bottom surface (11b) and wherein the circumferential wall (11c) is slidably arranged in the housing member (2).

Embodiment 13. The lever assist system according to embodiment 12, wherein the circumferential wall (11c) comprises a longitudinal slit (11d) through which the rocker member (8) extends.

Embodiment 14. The lever assist system according to embodiment 12 or 13, wherein the housing member (2) comprises a tubular bushing member (14) in which the actuator member (11) is

movably arranged, and wherein the circumferential wall (11c) is in sliding engagement with the bushing member (14).

Embodiment 15. The lever assist system according to any one of embodiments 7-14, wherein an alignment angle (α) between the longitudinal axis (L) of the actuator member (11) and a longitudinal axis (K) of the base member (3) lies between 0° and 90° degrees, more preferably between 0° and 45° degrees, and most preferably between 0°and 25° degrees, when the base member (3) is in the neutral position (P1), and wherein the longitudinal axis (K) of the base member (3) extends through the main pivot point (4) and the first connecting portion (5) of the base member (3).

Embodiment 16. The lever assist system according to embodiment 15, wherein the longitudinal axis (K) of the base member (3) and the longitudinal axis (L) of the actuator member (11) are spaced apart between 0 mm and 30 mm, preferably between 0 mm and 10 mm, over an offset distance (P) as measured along a pivoting axis (Y) of the main pivot point (4).

Embodiment 17. The lever assist system according to any one of embodiments 1-16, wherein the first connecting portion (5) of the base member (3) comprises a rotatable cable connector (15) for connecting a clutch or brake cable (C).

The present invention has been described above with reference to a number of exemplary embodiments as shown in the drawings. Modifications and alternative implementations of some parts or elements are possible, and are included in the scope of protection as defined in the appended claims.

CONCLUSIES

1. Een hendelhulpsysteem (1) voor het bedienen van een koppelings- of een remsysteem van een motorfiets, omvattende een behuizingsdeel (2) dat is ingericht voor montage op een stuur van een motorfiets;

een roteerbaar basisdeel (3) met een eerste basisuiteinde (3a) dat draaibaar is verbonden met het behuizingsdeel (2) om een hoofdscharnierpunt (4) daarvan tussen een neutrale positie (P1) en een bedieningspositie (P2), en een tweede basisuiteinde (3b) omvattende een eerste verbindingsgedeelte (5) dat is ingericht voor verbinding met een koppelings- of remsysteem van een motorfiets, en waarbij het basisdeel (3) een tweede verbindingsgedeelte (6) omvat voor verbinding met een handmatig bedienbaar hendeldeel (7);

waarbij het hendelhulpsysteem (1) verder een roteerbaar tuimeldeel (8) omvat dat draaibaar is gemonteerd en in rotatievoorspanning is aangebracht op het behuizingsdeel (2) om een secundair scharnierpunt (4a) daarvan, waarbij het tuimeldeel (8) een eerste tuimeluiteinde (8a) omvat dat is voorzien van een hoofdnokoppervlak (9),

waarbij het basisdeel (3) een volgerdeel (10) omvat dat in aangrijping is met het hoofdnokoppervlak (9), en waarbij de aangrijping tussen het hoofdnokoppervlak (9) en het volgerdeel (10) is ingericht om rotatie van het basisdeel (3) te assisteren in de bedieningspositie (P2).

2. Het hendelhulpsysteem volgens conclusie 1, waarbij het basisdeel (3) een sleuf (3c) omvat waardoor het tuimeldeel (8) zich beweegbaar uitstrekt.

3. Het hendelhulpsysteem volgens conclusie 2, waarbij het volgerdeel (10) zich lateraal uitstrekt door de sleuf (3c).

4. Het hendelhulpsysteem volgens één van de conclusies 1-3, waarbij het volgerdeel (10) een roteerbaar roldeel (10a) omvat in rolbare aangrijping met het hoofdnokoppervlak (9).

5. Het hendelhulpsysteem volgens één van de conclusies 1-4, waarbij het hoofdnokoppervlak (9) een neutraal oppervlakgedeelte (9a) omvat in voorgespannen aangrijping met het volgerdeel (10) wanneer het basisdeel (3) zich in de neutrale positie (P1) bevindt, en een bedieningsoppervlakgedeelte (9b) in voorgespannen aangrijping met het volgerdeel (10) voor rotatieassistentie van het basisdeel (3) in de bedieningspositie (P2), en waarbij het neutrale oppervlakgedeelte (9a) en het bedieningsoppervlakgedeelte (9b) verschillende oppervlaktekrommingen hebben.

6. Het hendelhulpsysteem volgens conclusie 5, waarbij het neutrale oppervlakgedeelte (9a) een recht oppervlakgedeelte (9a) is dat in hoofdzaak loodrecht op een rechte krachtlijn (F) is opgesteld die zich uitstrekt van het hoofdscharnierpunt (4) naar het rechte oppervlakgedeelte (9a)

wanneer het basisdeel (3) zich in de neutrale positie (P1) bevindt, en waarbij het bedieningsoppervlakgedeelte (9b) een gebogen oppervlakgedeelte (9b) is.

7. Het hendelhulpsysteem volgens één van de conclusies 1-6, waarbij het tuimeldeel (8) een tweede tuimeluiteinde (8b) omvat tegenover het eerste tuimeluiteinde (8a), waarbij het secundair scharnierpunt (4a) is aangebracht tussen het eerste en tweede tuimeluiteinde (8a, 8b), en waarbij het behuizingsdeel (2) een actuatordeel (11) omvat dat beweegbaar is aangebracht langs een lengteas (L) daarvan en in voorgespannen aangrijping is met het tweede tuimeluiteinde (8b).

8. Het hendelhulpsysteem volgens conclusie 7, waarbij het tweede tuimeluiteinde (8b) een gebogen secundair nokoppervlak (12) omvat voor aangrijping met het actuatordeel (11).

9. Het hendelhulpsysteem volgens conclusie 7 of 8, waarbij het basisdeel (3) in hoofdzaak evenwijdig aan de lengteas (L) van het actuatordeel (11) is opgesteld wanneer het basisdeel (3) zich in de neutrale positie (P1) bevindt.

10. Het hendelhulpsysteem volgens één van de conclusies 7-9, waarbij het behuizingsdeel (2) verder een veerdeel (13) omvat dat langs de lengteas (L) is opgesteld en waarbij het veerdeel (13) in veerkrachtige aangrijping is met het actuatordeel (11).

11. Het hendelhulpsysteem volgens conclusie 10, waarbij het actuatordeel (11) een uitstekend basisgedeelte (11a) omvat dat zich uitstrekt in het veerdeel (13).

12. Het hendelhulpsysteem volgens één van de conclusies 7-11, waarbij het actuatordeel (11) een buisvormig actuatordeel is dat een bodemoppervlak (11b) omvat dat in aangrijping is met het tweede tuimeluiteinde (8b), en waarbij het actuatordeel (11) een omtrekswand (11c) omvat die zich uitstrekt vanaf het bodemoppervlak (11b) en waarbij de omtrekswand (11c) verschuifbaar is aangebracht in het behuizingsdeel (2).

13. Het hendelhulpsysteem volgens conclusie 12, waarbij de omtrekswand (11c) een longitudinale spleet (11d) omvat waardoor het tuimeldeel (8) zich uitstrekt.

14. Het hendelhulpsysteem volgens conclusie 12 of 13, waarbij het behuizingsdeel (2) een buisvormig busdeel (14) omvat waarin het actuatordeel (11) beweegbaar is opgesteld, en waarbij de omtrekswand (11c) in glijdende aangrijping is met het busdeel (14).

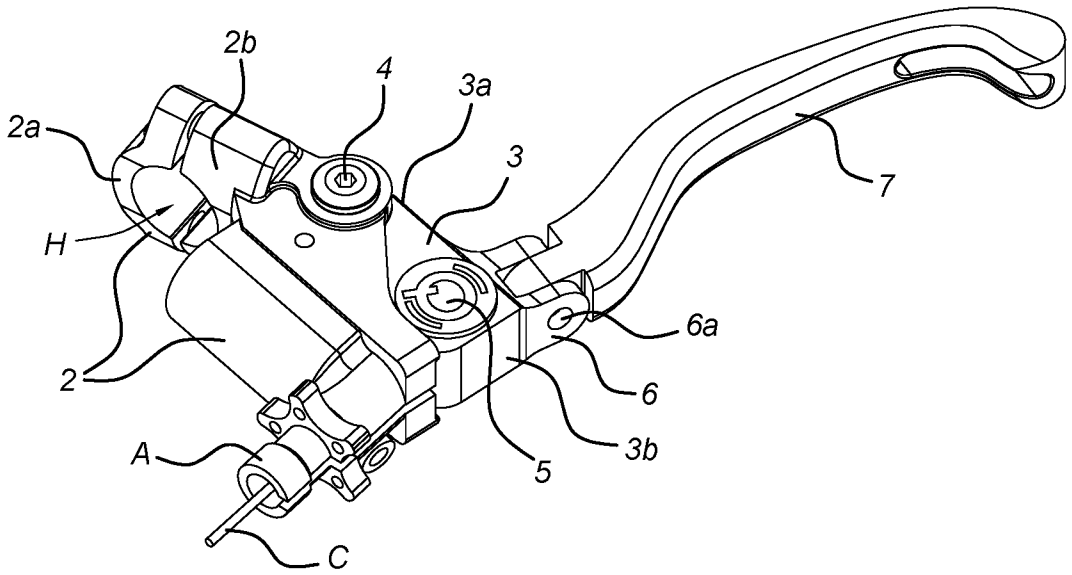
15. Het hendelhulpsysteem volgens één van de conclusies 7-14, waarbij een uitlijningshoek (α) tussen de lengteas (L) van het actuatordeel (11) en een lengteas (K) van het basisdeel (3) tussen 0° en 90° graden ligt, meer bij voorkeur tussen 0° en 45° graden, en met de meeste voorkeur tussen 0° en 25° graden, wanneer het basisdeel (3) zich in de neutrale positie (P1)

bevindt, en waarbij de lengteas (K) van het basisdeel (3) zich uitstrekt door het hoofdscharnierpunt (4) en het eerste verbindingsgedeelte (5) van het basisdeel (3).

16. Het hendelhulpsysteem volgens conclusie 15, waarbij de lengteas (K) van het basisdeel (3) en de lengteas (L) van het actuatordeel (11) op afstand van elkaar liggen tussen 0 mm en 30 mm, bij voorkeur tussen 0 mm en 10 mm, over een verschoven afstand (P) gemeten langs een zwenkas (Y) van het hoofdscharnierpunt (4).

17. Het hendelhulpsysteem volgens één van de conclusies 1-16, waarbij het eerste verbindingsgedeelte (5) van het basisdeel (3) een roteerbare kabelconnector (15) omvat voor verbinding met een koppelings- of remkabel (C).

Fig. 1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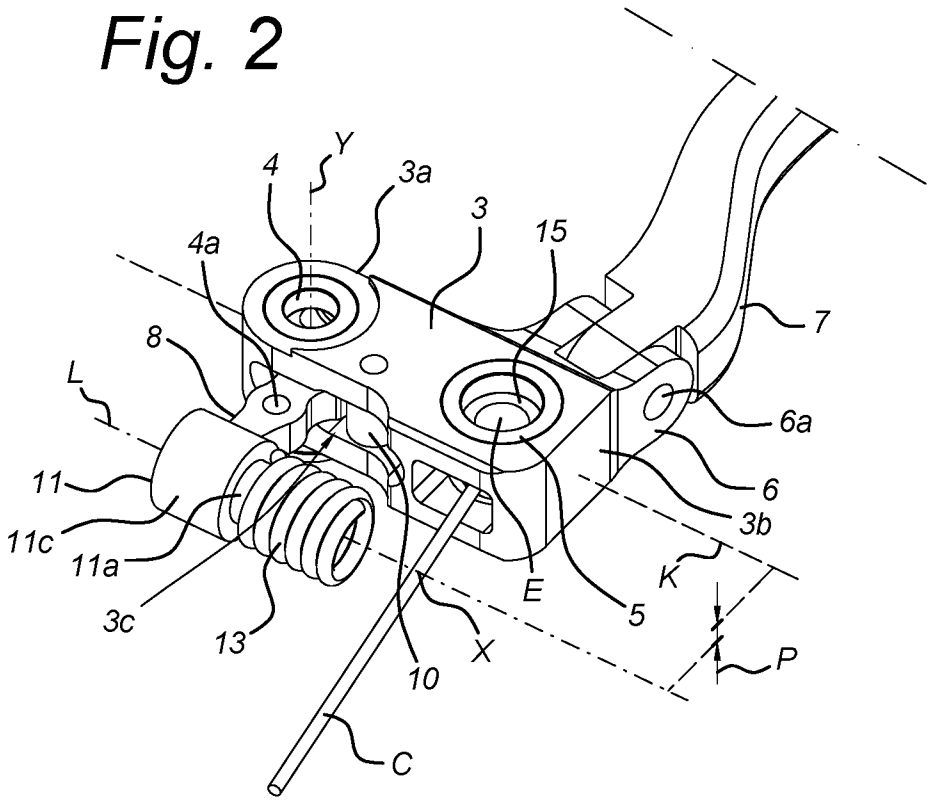
4
3a
2a
3
7
H
6a
2
6
3b
A
5
C

Fig. 2


Y
4
3a
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7
8
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6a
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11a
K
E
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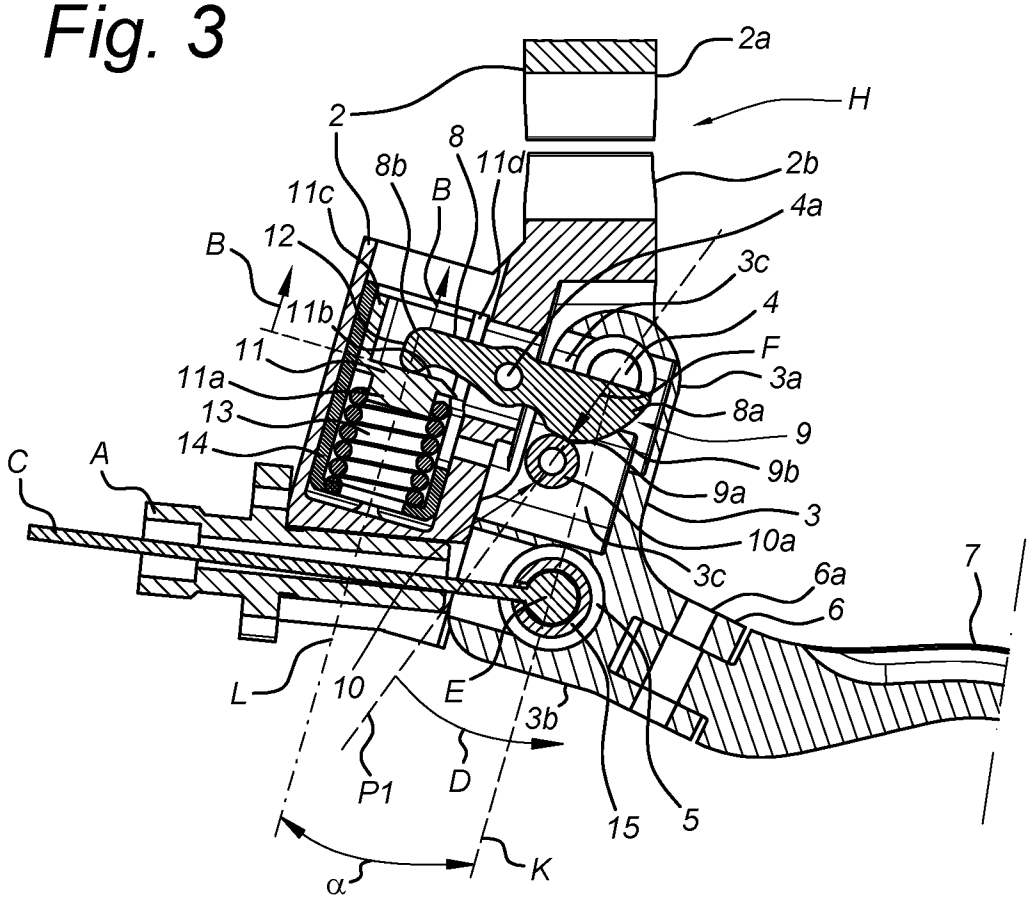
3c
13
X
P
10
C

Fig. 3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3a
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8a
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9b
C
A
9a
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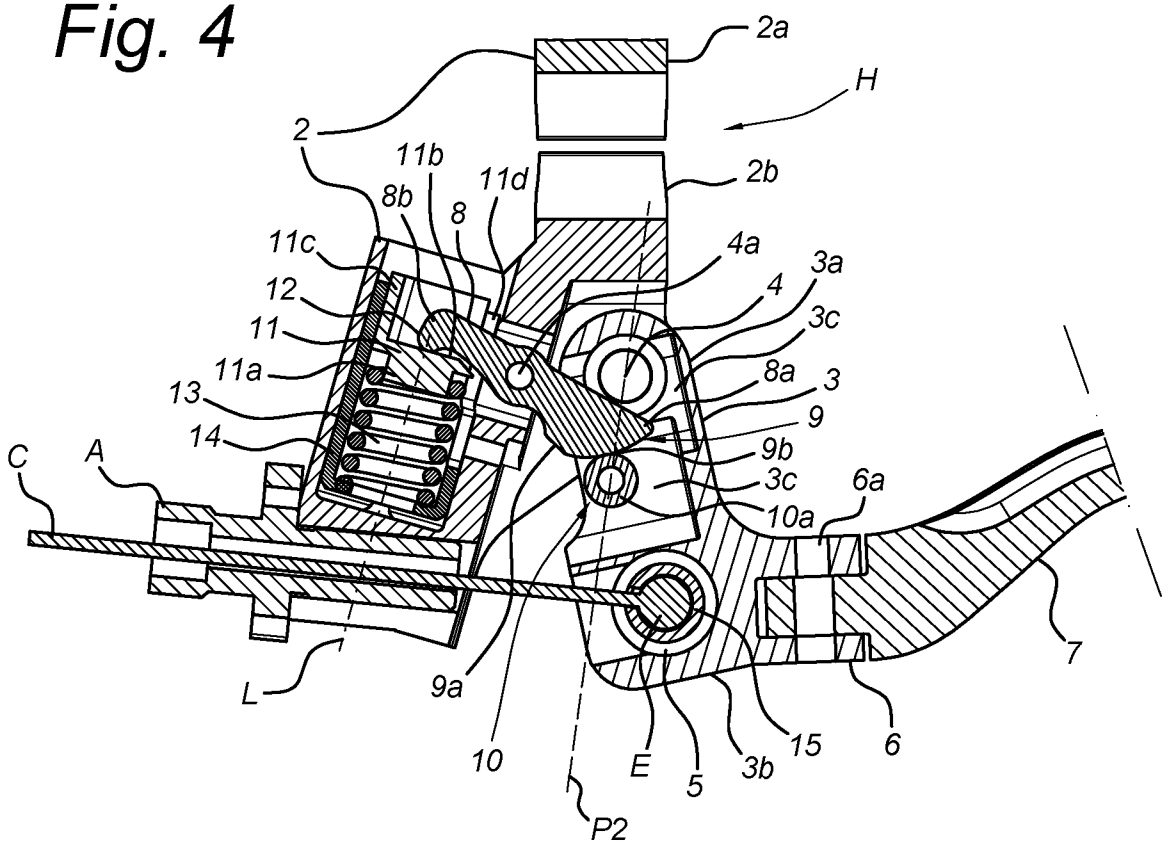
K

Fig. 4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3c
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7
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9a
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E
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3b
15
6
P2

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE
	P6091221NL
Nederlands aanvraag nr. **2024919**	Indieningsdatum **17-02-2020**
	Ingeroepen voorrangsdatum
Aanvrager (Naam) **PRO DEVELOP B.V.**	
Datum van het verzoek voor een onderzoek van internationaal type **25-04-2020**	Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr. **SN76072**

I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)

Volgens de internationale classificatie (IPC)

Zie onderzoeksrapport

II. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimumdocumentatie

Classificatiesysteem	Classificatiesymbolen
IPC	**Zie onderzoeksrapport**

Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

III.	☐	**GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES**	(opmerkingen op aanvullingsblad)
IV.	☐	**GEBREK AAN EENHEID VAN UITVINDING**	(opmerkingen op aanvullingsblad)

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2024919

A. CLASSIFICATIE VAN HET ONDERWERP
INV. B62K23/06 B62K11/14 B62L3/02 F16D23/12 G05G1/04
ADD.

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

B. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte miminum documentatie (classificatie gevolgd door classificatiesymbolen)
B62K F16D G05G B62L B62M

Onderzochte andere documentatie dan de mimimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)
EPO-Internal

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie °	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X A	JP S58 97581 A (HONDA MOTOR CO LTD) 10 juni 1983 (1983-06-10) * figuren 1-4 *	1,4-7, 9-11, 15-17 2,3,8, 12-14

X	JP S62 249213 A (KAWASAKI HEAVY IND LTD) 30 oktober 1987 (1987-10-30) * figuren 1-4,7,8 *	1

X	JP H08 258777 A (KAWASAKI HEAVY IND LTD) 8 oktober 1996 (1996-10-08) * figuren 4,5 *	1

X	US 5 924 328 A (OKAJIMA SHINPEI [JP] ET AL) 20 juli 1999 (1999-07-20) * figuren 4,6,7,16,17 *	1

☐ Verdere documenten worden vermeld in het vervolg van vak C.

☒ Leden van dezelfde octrooifamilie zijn vermeld in een bijlage

° Speciale categorieën van aangehaalde documenten

"A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

"D" in de octrooiaanvrage vermeld

"E" eerdere octrooi(aanvrage), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

"L" om andere redenen vermelde literatuur

"O" niet-schriftelijke stand van de techniek

"P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur

"T" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvrage, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding

"X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

"&" lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid	Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type
6 oktober 2020	

Naam en adres van de instantie	De bevoegde ambtenaar
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Booij, Nico

1

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2024919

In het rapport genoemd octrooigeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
JP S5897581 A	10-06-1983	GEEN	
JP S62249213 A	30-10-1987	GEEN	
JP H08258777 A	08-10-1996	JP 2695391 B2 JP H08258777 A	24-12-1997 08-10-1996
US 5924328 A	20-07-1999	GEEN	

WRITTEN OPINION

File No.	Filing date *(day/month/year)*	Priority date *(day/month/year)*	Application No.
SN76072	17.02.2020		NL2024919

International Patent Classification (IPC)
INV. B62K23/06 B62K11/14 B62L3/02 F16D23/12 G05G1/04

Applicant
PRO DEVELOP B.V.

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the application
- ☒ Box No. VIII Certain observations on the application

	Examiner
	Booij, Nico

Application number

WRITTEN OPINION

NL2024919

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ on paper

   ☐ in electronic form

   c. time of filing/furnishing:

   ☐ contained in the application as filed.

   ☐ filed together with the application in electronic form.

   ☐ furnished subsequently for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes:	Claims	2-4, 8, 12-14, 16
	No:	Claims	1, 5-7, 9-11, 15, 17
Inventive step	Yes:	Claims	2, 3, 8, 12-14
	No:	Claims	1, 4-7, 9-11, 15-17
Industrial applicability	Yes:	Claims	1-17
	No:	Claims	

2. Citations and explanations

see separate sheet

WRITTEN OPINION

Box No. VIII Certain observations on the application

see separate sheet

Reference is made to the following documents, the numbering will be adhered to in the rest of the procedure.

D1 JP S58 97581 A (HONDA MOTOR CO LTD) 10 juni 1983

D2 JP S62 249213 A (KAWASAKI HEAVY IND LTD) 30 oktober 1987

D3 JP H08 258777 A (KAWASAKI HEAVY IND LTD) 8 oktober 1996

D4 US 5 924 328 A (OKAJIMA SHINPEI [JP] ET AL) 20 juli 1999

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement.

1 The present application does not meet the criteria of patentability, because the subject-matter of claims 1, 5 to 7, 9 to 11, 15 and 17 is not new.

1.1 Document D1 discloses all features of independent claim 1 (the references in parentheses applying to this document):

Een hendelhulpsysteem (see figure 3) voor het bedienen van een koppelings- of een remsysteem (B) van een motorfiets (see figure 1), omvattende een behuizingsdeel (1) dat is ingericht voor montage op een stuur (H) van een motorfiets; een roteerbaar basisdeel (see figure 3: Lmount = mounting portion of L comprising 3 and 10) met een eerste basisuiteinde (part of L at 3) dat draaibaar is verbonden met het behuizingsdeel (1) om een hoofdscharnierpunt (3) daarvan tussen een neutrale positie (shown in figure 3) en een bedieningspositie (shown in figure 3A), en een tweede basisuiteinde (part of L receiving end of brake cable Wi) omvattende een eerste verbindingsgedeelte (see figure 4) dat is ingericht voor verbinding met een koppelings- of remsysteem (B) van een motorfiets, en waarbij het basisdeel (Lmount) een tweede verbindingsgedeelte (see figure 3: at right side of 10) omvat voor verbinding met een handmatig bedienbaar hendeldeel (Lgrip = grip portion of L); waarbij het hendelhulpsysteem verder een roteerbaar tuimeldeel (8) omvat dat draaibaar is gemonteerd (by means of pin 9) en in rotatievoorspanning (by means of spring 12) is aangebracht op het behuizingsdeel (1) om een secundair scharnierpunt (9) daarvan, waarbij het tuimeldeel (8) een eerste tuimeluiteinde (8a) omvat dat is voorzien van een hoofdnokoppervlak (11), waarbij het

basisdeel (Lmount) een volgerdeel (10) omvat dat in aangrijping is (see figure 3) met het hoofdnokoppervlak (11), en waarbij de aangrijping tussen het hoofdnokoppervlak (11) en het volgerdeel (10) is ingericht om rotatie van het basisdeel (Lmount) te assisteren (see figure 3A: the spring force urges rocker 8 to rotate counter clockwise => surface 11 will push 10 upwards and assist handle L in returning to the neutral position) in de bedieningspositie (shown in figure 3A).

It is recognised that in D1 rocker 8 is intended to rotate ratchet wheel 5 and not intended for assisting rotation of the brake handle. However, rocker 8 pushes against cam follower 10 in the same way as in the present invention and will therefore assist the rotation of handle L in the counter clockwise direction. The system of D1 perfectly fits the wording of claim 1.

Hence, the subject-matter of claim 1 is not new over D1.

1.2 D1 also discloses the additional features of dependent claim 5 (see figures 3 and 3A: cam surfaces 11a and 11b have different shapes), claim 6 (see figures 3 and 3A: cam surface 11b that belongs to the neutral position is straight and pushing cam follower 10 along a direction oriented from 3 to 10; cam surface 11a that belongs to the operation position is curved), claim 7 (see figure 3: second pivot 9 is placed between first and second rocker ends 8a and 8b; the hook of spring 12 is fixed to 8b under pretension and forms the actuator part), claim 9 (see figure 3: the longitudinal direction of the hook of spring 12 that forms the actuator part, is oriented in the same direction as base part Lbasis), claim 10 (spring 12), claim 11 (the hook of spring 12 that forms the actuator part extends from the spring part), claim 15 (see figures 3 and 4: the longitudinal direction of the hook of spring 12 that forms the actuator part, is oriented in the same direction as a line through pivot 3 and the fitting position of the end of cable Wi) and claim 17 (see figure 4: a rotatable cable connector is used).

Hence, also the subject-matter of claims 5 to 7, 9 to 11, 15 and 17 is not new over D1.

2 The present application does not meet the criteria of patentability, because the subject-matter of claims 4 and 16 does not involve an inventive step.

2.1 Just to be complete, an inventive step objection against claim 1 is raised on basis of D2. D2 shows various examples for assisting the rotation of a lever by means of a cam and a cam follower, wherein the follower is under pretension. This concept is thus by no means inventive.

Claim 1 adds to this known concept that the working force direction of a spring that provides the pretension, is inverted by means of a rocker. Also this is well known, see for example D1.

Hence, the subject-matter of claim 1 is not inventive over D2 and the common knowledge of the skilled person.

Similar objections against claim 1 are raised on basis of D3 and D4.

2.2 Claim 4 defines the cam follower part to have a rotatable part. D1 is silent on cam follower part rolling or sliding over cam surface 11. Rolling or sliding are however known exchangeable alternatives. Applying a rolling cam follower in the system of D1, does not require inventive skills.

2.3 Exact measurements can not be taken from the figures of D1. The range defined in claim 16 can not be checked, but is at least not inventive over D1.

3 Claims 2, 3, 8 and 12 to 14 define details of the system, which are not obvious.

Re Item VIII

Certain observations on the application.

4 Claim 9 defines longitudinal axis L to be parallel to base part 3, while claim 15 state that the longitudinal axis K of base part 3 can be at 90 degrees with longitudinal axis L. Claim 15 in a version of being dependent on claim 9 is therefore unclear.