

A HAND FREE GRIP-TWIST CONTROL

The current application relates to one or more devices and methods for a hand free grip-twist control. The application also relates one or more methods for making,
5 assembling, disassembling, installing, configuring, maintaining, repairing and using the one or more devices for the hand free grip-twist control.

A handgrip grip-twist mechanism has a rotatable grip around a handlebar. The rotatable grip when rotated will usually not stay in a new position but will return to its original
10 position. This is a result of a spring within the rotatable grip that forces the rotatable grip to return to its original position.

One example is a handgrip controlled motorcycle which faces an inherent problem of maintaining a fixed speed of the motorcycle. The rider of the vehicle has to place his
15 hand on the grip and apply a rotational force resulting in fatigue of the rider's wrist and hand. Once the hand of the rider is released from the grip, the speed of the motor resumes to its steady state and the travelling motorcycle decelerates.

The conventional way of maintaining the speed of the motorcycle is to grip and twist on
20 a handle grip. This however increases the fatigue level of the rider's wrist and hand. The art work well on automatic as well as on manual gear system.

Another way of maintaining the speed of the motorcycle is to lock the grip by an external device. This however poses a potential hazard. In the event of an emergency, the rider
25 would have to unlock before assuming control of the motorcycle.

It is an object of the present application to provide a new and an improved hand free grip-twist control for improving the user experience when using a hand free grip-twist
30 type of control.

The present application further aims to provide one or more new and useful methods for making, assembling, disassembling, installing, configuring, maintaining, repairing
and using the one or more tools for the hand free grip-twist control. Essential features

of the inventions are provided by one or more independent claims, whilst advantageous features are presented by their dependent claims respectively.

According to a first aspect, the present application provides a hand free grip-twist
 5 control for regulating the speed of a motorcycle engine whereby a tension cable tethered to a cable retainer stays at a position even when a hand of a rider releases his grip on the handgrip.

The hand free grip-twist control device comprises a housing body providing housing for
 10 a cylindrical extension surrounding the handlebar. The housing body supports a rotating part with a grip portion along the handle for the rider to hold tight on and a cable retainer for retaining a tension cable. A ring secured to the cylindrical extension on the housing body securing the rotating part in the middle preventing it from slipping out of the handlebar. The tension cable is tethered to the cable retainer at the rotating part. When
 15 the rider grip and twist the grip part at the rotating part, the tension cable will be pulled or released accordingly. The ball of the cable retainer may not be spherical.

The tension cable head has a retainer that was linked through the housing support held tightly in between a key way linking all the way till to the carburettor with a tensional
 20 spring forces. When the rider applies an equal or greater force, it causes the engine to raise the revolutions per minute higher till upon engaging in a gear causing a motion to surge.

The hand free grip works on both with and without any tension cable

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In a first embodiment, the tension cable is secured by using the attraction force and/or repelling forces of a magnet located at the cable retainer where the tension cable is held. The ball of the cable retainer rests on one of the circular dimple of the annular disc at the housing body. When the rider twists the grip, the cable ball travels on the
 30 dimples. The attraction force and/or repelling forces of the magnet creates a firm resistance and prevents the cable ball from reverting to its original position when the rider's hand is released.

The hand free grip-twist control comprises a housing body secured to a handlebar. The housing body has a cylindrical extension surrounding the handlebar and a housing annulus with a recess. An annular disc having a plurality of indented circular dimples and an indented concentric groove connecting the circular dimples is located in the recess of the housing annulus. A rotating part has a cable retainer with an annular magnet at the inner hollow cavity and mounted on the cylindrical extension by rotating around the said cylindrical extension, the housing annulus at least partially surrounding the cable retainer. A ring positioned at the distal end of the rotating part and connected to the cylindrical extension. The cylindrical extension having a plurality of protrusions extending from one end, the protrusions having a plurality of retaining profiles for coupling the ring, the protrusions and retaining profiles not exceeding an outer diameter of the cylindrical extension.

In a second embodiment, the annular disc is replaced by a circular tool with a saw tooth periphery. Instead of using a magnet, a rotatable annular tool with a cable hanger is affixed at a point. The edge of the cable hanger rests on one tooth of the saw tooth periphery. A retaining coil also known as a spring or resistance is used to exert a tensional force on the rotatable annular tool pushing onto the circular tool with a saw tooth periphery. Similar to the first embodiment, when the rider releases his grip the tension cable remains because the cable hanger is attached to the saw tooth periphery.

The second embodiment comprises the housing body secured to the handlebar, the housing body having the cylindrical extension surrounding the handlebar and the housing annulus having the recess. A circular tool having a hole in the centre with a saw tooth periphery is located in the recess of the housing annulus. A rotatable annular tool having a cable hanger position an edge. A retaining coil or a spring position at the opposite surface of the annular tool having a cable hanger with an edge. The rotating part is mounted on the cylindrical extension by rotating around the said cylindrical extension, the housing annulus at least partially surrounding the cable retainer. The ring is positioned at the distal end of the rotating part and connected to the cylindrical extension. The cylindrical extension having a plurality of protrusions extending from one end, the protrusions having a plurality of retaining profiles for coupling the ring, the protrusions and retaining profiles not exceeding an outer diameter of the cylindrical extension.

In the first and second embodiment, the tension cable is controlled by devices interacting between the cable retainer and the housing body using magnetic force and mechanical force by spring tension or frictional forces.

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In a third embodiment, the control of the tension cable lies at the distal end of the grip part and the ring. There is no direct interaction with the tension cable, no doubt the tension cable is secured by the cable retainer. The principle is to control the grip part, making it stationary when the rider's hand is released by having the annular magnet near the ring and a rotatable annular disc in the groove at the distal end of the grip part. The annular magnet is different from the first embodiment. The annular magnet in the third embodiment has a circular protrusion on one of the surface. This protrusion is to rest in the one of the dimples on the rotatable annular disc. When the rider twists the grip part, the rotatable annular disc interacts with the protrusions on the annular magnet.

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The third embodiment comprises the housing body fixed to the handlebar, the housing body having the cylindrical extension surrounding the handlebar and the housing annulus having the recess. The rotating part mounted on the cylindrical extension by rotating around the said cylindrical extension, the housing annulus at least partially surrounding the cable retainer. A rotatable annular disc having a plurality of indented circular dimples and an indented concentric groove connecting the circular dimples located in the groove of the rotating part. An annular magnet with a round protrusion on at least one of its surfaces. The ring positioned at the rotating part and connected to the cylindrical extension. The cylindrical extension having a plurality of protrusions extending from one end, the protrusions having a plurality of retaining profiles for coupling the ring, the protrusions and retaining profiles not exceeding an outer diameter of the cylindrical extension.

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In a fourth embodiment, the tension cable control is addressed between the cable retainer and the proximal end of the grip part. Proximal end of the grip part is the section that interacts with the cable retainer. The rotating part comprises the cable retainer and the grip part are separated. The cable retainer side has a hole disposed at the centre with a square teeth periphery. Correspondingly, there is a protruded centre hole at the proximal end of the grip part. The protruded centre hole has a corresponding square

tooth perimeter. When the rider's hand twists the grip part. The square tooth will interact with the square tooth at the cable retainer. The grooves and ridges of the square tooth forbids the tension cable from returning to its original position and thereby achieving the art.

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The fourth embodiment comprises a housing body fixed to a handlebar, the housing body having a cylindrical extension surrounding the handlebar and a housing annulus having a recess. a cable retainer having a hole disposed in the centre with at least one square tooth periphery is mounted on the cylindrical extension by rotating around the said cylindrical extension, the housing annulus at least partially surrounding the cable retainer. A rotatable grip part having a protruded disposed in the centre at one end with at least one corresponding square tooth periphery and a cable hanger on at least one of the square tooth and mounted into the square tooth periphery at the cable retainer. The ring positioned at the rotating part and connected to the cylindrical extension. The cylindrical extension having a plurality of protrusions extending from one end, the protrusions having a plurality of retaining profiles for coupling the ring, the protrusions and retaining profiles not exceeding an outer diameter of the cylindrical extension.

In a fifth embodiment, the grip part is long that encapsulates a longer surface area of the handlebar. The retaining profiles are T-shaped and connected with the correspondingly shaped securing profiles on the ring. The securing profiles on the ring are hooks.

Alternatively, the magnets used in the first and third embodiment can also be of non-magnets. In the first embodiment, the compression between the annular disc having the dimples and the inner hollow cavity at the cable retainer provides enough compressional force to secure the ball of the tension cable. Therefore, the annular magnet may be replaced or removed. In the third embodiment where the annular magnet with the circular protrusion is positioned at the ring may not be a magnet. The annular magnet may be replaced with an annual disc with a circular protrusion.

In embodiments two and three, the saw-tooth and square-tooth shaped periphery are formed along the periphery respectively are used for illustrative purpose. In fact, it can

be of any shape as long as it provides a ridge and groove concept. The number of tooth may be increased to ensure a smooth rotation of the rotating part.

5 The retaining profiles are capable of being joined and released to the securing profiles on the ring. The retaining profiles are openings in the protrusions.

10 The plurality of protrusions has a limited spring travel in a radial direction. The protrusions have a configuration such that the protrusions are connected to and or released from the ring when the hand free grip-twist control device is not mounted onto the handlebar.

The securing profile is released from the retaining profile by turning the ring relative to the cylindrical extension.

15 The rotating part is secured in an axial position by the housing body at one end and an end face of the ring at the other end. The rotating part is surrounded by a grip part made from a rubber-elastic material and fixed to the rotating part which is rotational. The rotating part is encapsulated by the grip part, thereby attaching it permanently to the rotating part.

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On a side opposite the cable retainer, the distal end of the grip part has an angulated rim extending beyond an overall length of the rotating part, pointing radially inward and projecting unto an outward facing groove in the ring to form an intricate seal.

25 The groove of the ring is formed in a collar substantially covering an end of the grip part.

The outside diameter of the cylindrical extension is designed as a matching support for the rotating in relation to the rotating part without gaps.

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The method of controlling the speed of a motor engine with the hand free grip-twist control for controlling the cable tension to the motor engine transmission comprising:

Gripping the grip part,

Rotating the grip part,

Providing a corresponding cable tension to the motor engine transmission,
 Securing the position of the grip part,
 Releasing the position of the grip part.

- 5 The means to securing and releasing is by a tensional force exerted between two corresponding surfaces. One of the means is by a retaining coil

The means to securing and releasing is by attraction force exerted between two corresponding surfaces. One of the means is by a magnet. Another means may be by
 10 an electromagnet.

The method of assembling and disassembling the first embodiment comprising the following steps:

- 15 Sliding the housing body onto the handlebar tube of the handlebars of the motorcycle,
 Sliding the annular disc into the housing annulus of the housing body. The annular disc is a circular disc with a hole in the centre. The diameter of the hole is longer than the cross sectional diameter of the handlebar.
 Sliding the rotating part onto the handlebar tube of the handlebars of the
 20 motorcycle,
 Pulling a tension cable from a cable inlet to a cable hanger at the cable retainer, rotating the cable retainer with the annular magnet to secure the tension cable on itself,
 Supporting the cable ball of the tension cable at the circular dimple of the annular
 25 disc at the recess of the housing annulus,
 Encapsulating the rotating part in the housing body, and
 sliding the ring onto the handlebar tube of the handlebars of the motorcycle, and securing the housing body, the annular disc and the rotating part with the ring by aligning the retaining profiles at the protrusions with the securing profiles at the
 30 ring.

The method of assembling and disassembling the second embodiment comprising the following steps:

Sliding the housing body onto the handlebar tube of the handlebars of the motorcycle,

sliding the circular tool with a saw tooth periphery similar to a gear into the housing annulus of the housing body,

5 sliding the rotating part onto the handlebar tube of the handlebars of the motorcycle,

pulling a tension cable from a cable inlet to a cable hanger at the annular tool,

rotating the cable retainer with the annular tool to secure the tension cable on itself,

10 supporting the edge of the cable hanger in between two saw tooth peaks along the periphery of the circular tool located at the recess of the housing annulus, encapsulating the rotating part in the housing body, and

sliding the ring onto the handlebar tube of the handlebars of the motorcycle, and

securing the housing body, the annular disc and the rotating part with the ring by

15 aligning the retaining profiles at the protrusions with the securing profiles at the ring.

The method of assembling and disassembling the third embodiment comprising the following steps:

20 sliding the housing body onto the handlebar tube of the handlebars of the motorcycle,

sliding the rotating part onto the handlebar tube of the handlebars of the motorcycle,

pulling a tension cable from a cable inlet to a cable hanger at the cable retainer,

25 rotating the cable retainer to secure the tension cable on itself,

supporting the cable ball of the tension cable at the cable retainer,

encapsulating the rotating part in the housing body,

having the annular disc with the dimples and concentric groove into the grip part of the rotating part,

30 having the annular magnet with a knob into the ring,

having the knob resting on one of the dimples of the annular disc, and

sliding the ring onto the handlebar tube of the handlebars of the motorcycle.

securing the housing body, the annular disc and the rotating part with the ring by aligning the retaining profiles at the protrusions with the securing profiles at the ring.

- 5 The method of assembling and disassembling the fourth embodiment comprising the following steps:
 - sliding the housing body onto the handlebar tube of the handlebars of the motorcycle,
 - sliding the cable retainer having the centre hole with square tooth periphery onto
 - 10 the handlebar tube of the handlebars of the motorcycle,
 - sliding the grip part having the protruded centre hole with the corresponding square tooth periphery and insert in the cable retainer,
 - pulling a tension cable from a cable inlet to a cable hanger at the grip part,
 - sliding the ring onto the handlebar tube of the handlebars of the motorcycle and
 - 15 securing the housing body, the annular disc and the rotating part with the ring by aligning the retaining profiles at the protrusions with the securing profiles at the ring.

20 The hand free grip-twist control device providing a manual smooth control of having a fix position on the hand free grip portion art controlling the tension cable is provided whereby the tension cable is secured by means of compression, tension and attraction. The means are achieved mechanically by using springs, gear like structures and magnetic force.

- 25 The motorcyclist using the present art application can enjoy travelling longer distance road trip on the motorcycle maintaining a smoother travelling speed with the controlling hand gently on the hand grip portion to a position that corresponds to a desire speed and then releases the controlling hand free off from the gripping posture position as an art. The hand free grip part will remain in the set desire speed relieving the wrist tension.
- 30 Whenever to change the travelling speed, the motorcyclist just holds on the grip part and twists the grip part by either flexing or extending his wrist. Flexing the wrist will pull the tension cable and thus increasing the travelling speed. Extending the wrist will slacken the tension cable and thus decreasing the travelling speed.

The mechanism in the housing body, the rotating part and the ring provide means to secure the tension cable.

The subject of the present application is now explained with respect to the following
5 Figures in which

Fig. 1 illustrates an exploded view of the first embodiment of the grip-twist control device having an annular disc with dimples located at a housing body;

10 Fig. 2 illustrates a second embodiment of the hand free grip-twist control device having a circular tool with saw-tooth periphery located in the recess at the housing annulus;

15 Fig. 3 illustrates a third embodiment of the hand free grip-twist control device having the annular magnet located at the ring and the annular disc located at the grip part;

20 Fig. 4 illustrates a fourth embodiment of the hand free grip-twist control device having a caber retainer with a centre hole with a square teeth periphery and a corresponding square teeth periphery formed in one end of the grip part.

Fig. 5 illustrates a fifth embodiment of the hand free grip-twist control device having a longer grip part and a different cylindrical extension;

25 Fig.6 illustrates the grip part having an angulated rim of the rotating part of the hand free grip-twist control device.

30 In the following description, details are provided to describe the embodiments of the present specification. It shall be apparent to one skilled in the art, however, that the embodiments may be practice without these details or with other details.

Some embodiments have similar parts. The similar parts may have the same names or similar part numbers. The description of one part applies by reference to another similar part, where appropriate, thereby reducing the repetition of text without limiting
35 the disclosure of the description.

Fig. 1 illustrates to a first embodiment of the present application. In particular, Fig. 1 illustrates an exploded view of the first embodiment of the grip-twist control device **100** comprising a housing body **101**, an annular disc **103**, a rotating part **105** and a ring **107**.

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The housing body **101** comprises a cylindrical extension **109** and a housing annulus **111** having a recess **113**. The annular disc **103** is positioned at the recess **113** of the housing annulus **111**.

10 On a first side of the annular disc **103**, there is a plurality of circular dimples **118** indented around its periphery. Connecting the circular dimples **118** is a concentric groove **120**. The circular dimples **118** and the concentric groove **120** are indented. The depth of indentation is relative to the size of the cable ball. It is not to be more than one half of the radius of the cable ball. On a second side of the annular disc **103** is a flat surface. The second side of the annular disc **103** is inserted into the recess **113** of the housing annulus **111**. The first side of the annular disc **103** faces the cable retainer **115**.
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The rotating part **105** having a cable retainer **115** with an annular magnet **116** at the inner hollow cavity of the cable retainer **115** is mounted on an end of the cylindrical extension **109** with protrusions **117**. The flat surface is lodged in the hollow cavity of the cable retainer **115**. The housing annulus **111** encompasses the cable retainer **115**. The rotating part **105** having the cable retainer **115** with the annular magnet **116** will rotate on a longitudinal axis about the handlebar when mounted on the handlebar.
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25 The ring **107** is positioned at one side of the rotating part **105** on the distal end of the cylindrical extension **109** with protrusions **117**. The ring **107** has a plurality of securing profiles **121**, a groove **123** and a collar **125**.

The cylindrical extension **109** having a plurality of protrusions **117** on one end and having a plurality of retaining profiles **119** for coupling the ring **107**. The radial surface of the cylindrical extension **109** serves as a supporting surface for the rotating part **105** which has an outside diameter **127** which must not be exceeded by the protrusions **117** with the retaining profiles **119** to ensure a secure fit.
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The rotating part **105** is mounted to the housing body **101** by pushing it over the protrusions **117** and onto the cylindrical extension **109** of the housing body **101**. This results in the rotating part **105** being fixed to the housing body **101** and supported on the cylindrical extension **109**.

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The housing body **101** provides a casing for the intricate parts like the annular disc **103** and a tension cable (not shown) guided through a cable inlet (not shown) into the cable retainer **115** of the rotating part **105** from the dust and water.

10 The annular magnet **116** at the inner hollow cavity of the cable retainer **115** provides an attraction force to the annular disc **103** with circular dimples **118** found in the recess **113** of the housing annulus **111** of the housing body **101**.

15 The cable ball of the tension cable is supported in the circular dimple **118** of the annular disc **103** partially. A small surface area of the cable ball rests in the circular dimple **118**. The concentric groove **120** on the first side of the annular disc **103** provides a track for the cable ball to move from one circular dimple **118** to the adjacent circular dimple **118**.

20 The ring **107** provides a locking mechanism to fasten the rotating part **105** to the housing body **101** and to the handlebar (not shown).

The method of assembly for the hand free grip-twist control device **100** provides the housing body **101** configured in a way that the tension cable not shown in the figure may be pulled and released to control a motorcycle engine transmission.

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In a lengthwise direction, distal from the housing body **101**, the cylindrical extension **109** has protrusions **117** with retaining profiles **119** that can be joined together with securing profiles **121** of the ring **107**. The rotating part **105** is mounted to the housing body **101** by pushing it over the protrusions **117** and onto the cylindrical extension **109**
30 of the housing body **101**.

The flat surface of the annular disc **103** is inserted into the recess **113** of the housing annulus **111**. The tension cable is connected to the cable retainer **115** arranged on the rotating part **105**. A cable ball located at the end of the tension cable is arrested by a

cable hanger found in the cable retainer **115**. The tension cable is then wound around the cable retainer **115**. The tension cable is slackened during installation to provide easy access.

- 5 The rotating part **105** having the cable retainer **115** with the annular magnet **116** is mounted on the cylindrical extension **109** by rotating around the said cylindrical extension connected to the housing body **101**.

10 The cable ball of the tension cable is meticulously placed on one of the circular dimples **118** on the first side of the annular disc **103** at the recess **113** of the housing annulus **111**.

15 The cable ball supported by the cable hanger at the cable retainer **115** will move from one circular dimple **118** to the adjacent circular dimple on the concentric groove **120** when the rotating part **105** is rotated in either direction. The attraction force of the annular magnet **116** with the annular disc **103** creates a grip strength that will hold the cable ball of the tension cable in a fixed position and hence maintaining a fixed speed of the revolution on the motor engine.

- 20 The final assembly is having the rotating part **105** being attached to the housing body **101** by pushing it over the protrusions **117** and onto the cylindrical extension **109** and secured by the ring **107** on the distal end of the cylindrical extension **109**.

25 Alternatively, the annular disc **103** may be a piece of magnet to provide a stronger attraction force with the annular magnet **116** and hence creating a stronger grip strength on the cable ball. The magnet can be an electromagnet which derives its magnetism from a power source on the motorcycle or a permanent magnet.

30 Fig. 2 illustrates a second embodiment of the hand free grip-twist control device **100'** having a circular tool **131** with saw-tooth periphery located in the recess **113** at the housing annulus **111**.

A non-rotatable circular tool **131** with a hole in the centre in which the diameter of the hole is at least the outside diameter **127** of the cylindrical extension **109** with a saw

tooth periphery similar to a gear is located in the recess **113** at the housing annulus **111**.

5 An annular ring **133** of non-magnetic characteristics is at the inner hollow cavity **129** of the cable retainer **115**. The annular ring **133** has a retainer spring **135** that exerts a constant tension on the cable hanger pushing against the saw tooth periphery of the circular tool **131**.

10 The cable hanger has an edge **139** that can fit in between two saw tooth peaks along the periphery. Each saw tooth along the periphery of the circular tool **131** has two surfaces converging at a point. The two surfaces allow smooth movement of the cable hanger edge **139** from one tooth to the adjacent tooth.

15 The saw tooth provides a support on the edge **139** of the cable hanger **141** causing the cable retainer **115** from rotating and thus fixing the tension cable.

20 In operation, the grip part **137** of the rotating part **105** is rotatable, the cable hanger **141** with the edge **139** holding the cable ball (not shown) is travelling along the saw tooth periphery of the circular tool **131** at the housing annulus **111**, one tooth at a time in either direction. Hence the cable ball with the tension cable will be fixed at a position. A change in the cable ball position will have to be actuated by the motorcyclist either by extending or flexing the wrist.

25 Fig. 3 illustrates a third embodiment of hand free grip-twist control device **100''**. The annular magnet **116''** which is non-rotatable is located at the ring **107**. The annular disc **103''** with the dimples **118''** and concentric groove **120''** is located at the grip part **137** end of the rotating part **105**.

30 The annular disc **103** described in the first embodiment is different from the annular disc **103''** in the third embodiment in terms of size. The cross sectional diameter is shorter to fit into the end of the grip part **137**.

The annular magnet **116** described in the first embodiment is different from the annular magnet **116''** in the third embodiment. The annular magnet **116''** in the third embodiment

has a knob **143**. The knob **143** is supported by one circular dimple **118"**. The knob **143** is circular that fits into one circular dimple **118"**. The knob **143** is about one half of a sphere having a cross sectional diameter of at least the diameter of the circular dimple **118"**.

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The annular magnet **116"** provides an attraction force with the annular disc **103"**. The attraction magnetic force causes the grip part **137** to be non-rotatable. When the grip part **137** is unable to rotate, the cable retainer **115** will also be unable to move and hence fixing the position of the tension cable. The cable retainer **115** with a cable hanger (not shown) is supporting the tension cable (not shown).

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In use, the knob **143** on the annular magnet **116"** travels on the dimple **118"** and the concentric groove **120"** when the rotating part **105** is rotated by the motorcyclist. The knob **143** will fix the position of the rotating part **105**, which in effect fix the position of the tension cable (not shown).

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Fig. 4 illustrates a fourth embodiment of the hand free grip twist control device **100'''** having a centre hole with at least a square tooth periphery formed in the non-rotatable cable retainer **115'''**. A corresponding square teeth periphery formed in one end of the grip part **137'''** with a cable hanger **141'''**. The non-rotatable cable retainer **115'''** is fastened to the housing body **101'''**. The square teeth periphery has a depth of about ten millimeters, 10mm disposed in the centre hole of the cable retainer **115'''**.

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The grip part **137'''** having at least a corresponding square tooth along the perimeter of a protruded middle hole is rotatable about the cable retainer **115'''**. The protruded middle hole with the square teeth periphery is not shown in the figure in particular the protrusion. The cable hanger **141'''** is located at one of the square tooth along the perimeter of the middle hole.

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The ring **107'''** is fastened to the cylindrical extension of the housing body **101'''** securing the grip part **137'''**. The diameter of the corresponding square teeth perimeter at the grip part **137'''** is shorter than the square teeth periphery at the cable retainer **115'''**.

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The square teeth periphery on the non-rotatable cable retainer **115^{III}** provides a narrow horizontal surface for the cable hanger **141^{III}** to latch on. The cable hanger **141^{III}** provides a support for the tension cable.

- 5 In use, the non-rotatable cable retainer **115^{III}** is mounted onto the housing body **101^{III}** by pushing over the protrusions **117^{III}** of the cylindrical extension **109^{III}**. The corresponding protruded (not shown), smaller square teeth perimeter on the grip part **137^{III}** is analogous to a male connector and inserted into the bigger female square teeth periphery hole at the cable retainer **115^{III}**. The tension cable is then mounted on the
- 10 cable hanger **115^{III}** on the square teeth perimeter of the grip part **137^{III}**. The user rotates the grip part and in turn rotates the square shape teeth gear. The cable hanger with the tension cable travels circumscribe on the non-rotatable bigger square shape teeth gear, each tooth at a time either pulling or releasing the tension cable.
- 15 The method of assembly is similar to the earlier embodiments one to three.

Fig. 5 relates to a fifth embodiment of the hand free grip-twist control device **100^{IV}** having a longer grip part **137^{IV}** and a different cylindrical extension **109^{IV}**. The fifth embodiment comprises parts or method steps that are similar or identical to those of

20 the earlier embodiments one to four. Description of the similar or identical part or method steps is hereby incorporated by reference, wherever relevant and appropriate.

Fig. 5 illustrates an exploded view of the fifth embodiment of another hand free grip-twist control device **100^{IV}** comprising a housing body **101^{IV}**, an annular disc **103**, a

25 rotating part **105^{IV}** having an annular magnet **116** (not shown) and a ring **107^{IV}**.

While the retaining profiles **119** of the hand free grip-twist control device shown in Fig. 1 is designed as apertures, the protrusions **117^{IV}** shown in Fig. 5 has a T-shaped retaining profiles **119^{IV}** that can interact with correspondingly shaped securing profiles

30 **121^{IV}** in the ring **107^{IV}**. The difference between the assembly of the ring **107^{IV}** with the protrusions **117^{IV}** and the assembly of the ring **107^{IV}** with the protrusions **117^{IV}** is that, after being latched in, the retaining profiles **119^{IV}** of the protrusions **117^{IV}** can be disengaged from the securing profiles **121^{IV}** by turning the ring **107^{IV}**. During this process, the protrusions **117^{IV}** are deflected radially inward, and the ring **107^{IV}** can be

pulled off axially. This is only possible while the hand free grip-twist control device **100^{IV}** is not mounted on the handlebar tube of the handlebars of the motorcycle.

In addition, to the above mentioned difference in the retaining profiles **119^{IV}**, the length
 5 of the grip part **137^{IV}** of the rotating part **105^{IV}** is longer in length. The longer grip part **137^{IV}** covers a longer part of the handlebar providing more grip for the motorcyclist.

In use, the speed control apparatus **100^{IV}** is mounted onto a handlebar of the handlebar
 10 tube of the handlebars of the motorcycle. The housing body **101^{IV}** is pushed onto the circumference of the handlebar, followed by the rotating part **105^{IV}** and finally by the ring **107^{IV}** to secure the hand free grip-twist control device **100^{IV}**. The rotating part **105^{IV}** extends a longer length and encompassing the handlebars.

A motorcyclist uses his right palm to grip on the grip part **137^{IV}** of the rotating part **105^{IV}**
 15 to control the speed of revolution of the motorcycle engine.

The method of operating the hand free grip-twist control device **100^{IV}** to control the
 20 revolution of the motor engine provides a motorcyclist in a gripping and a non-gripping mode.

In the gripping mode, the motorcyclist grips the rotating part **105^{IV}** and may rotate either
 in a forward direction (wrist extension) or a backward direction (wrist flexion) about the
 axis of the handlebar. In a backward direction, the tension cable is pulled and thereby
 25 increases the speed of revolution of the motor. In a forward direction, the tension cable
 is loosened and hence decreasing the speed of the revolution of the motor.

In the non-gripping mode, the rotating part **105^{IV}** remains in a fixed position even after
 the motorcyclist releases his grip on the rotating part **105^{IV}**. The speed of the revolution
 of the motor is determined by the degree of rotation of the rotating part **105^{IV}**, which
 30 pulls or loosens the tension cable.

Referring to Fig. 1 and Fig. 5, the ring **107,107^{IV}** is pushed over the protrusions
117,117^{IV} within the rotating part **105,105^{IV}** until the securing profiles **121,121^{IV}** of the
 ring **107,107^{IV}** fit together with the retaining profiles **119,119^{IV}** of the protrusions

117,117^{IV}. This results in the protrusions **117,117^{IV}** being forced to deflect inward during assembly. Once the securing profiles **121,121^{IV}** are fitted together with the retaining profiles **119,119^{IV}** of the protrusions **117,117^{IV}**, the rotating part **105,105^{IV}** is fixed axially relative to the ring **107,107^{IV}** by an end face and in the other direction, is fixed along an axis relative to the housing body **101,101^{IV}**.

The smallest inside diameter of the cylindrical extension **109^{IV}** with its protrusions **117^{IV}** corresponds to the diameter of the handlebar. The rotating part **105^{IV}** has a grip part **137^{IV}** connected to a radially outward-facing surface of the rotating part **105^{IV}**, which is made from a rubber-elastic material to allow better operation by the hand of the motorcycle rider.

With reference to Fig. 6, the grip part **137^V** has an angulated rim **145** that projects beyond the axial length of the rotating part **105^V**. The angulated rim **145** points radially inward and extends into a groove **123^{IV}** in the ring **107^{IV}**, thereby providing an intricate seal against contamination of the interior of the rotating part **105^{IV}** and the housing body. The groove **123^V** is formed by an outer collar **125^V** at the end of the grip part **137^V**.

The following itemized list of elements describes further embodiments of the present application.

In the application, unless specified otherwise, the terms "comprising", "comprise", and grammatical variants thereof, intended to represent "open" or "inclusive" language such that they include recited elements but also permit inclusion of additional, non-explicitly recited elements.

As used herein, the term "about", in the context of concentrations of components of the formulations, typically means +/- 5% of the stated value, more typically +/- 4% of the stated value, more typically +/- 3% of the stated value, more typically, +/- 2% of the stated value, even more typically +/- 1% of the stated value, and even more typically +/- 0.5% of the stated value.

Throughout this disclosure, certain embodiments may be disclosed in a range format. The description in range format is merely for convenience and brevity and should not

be construed as an inflexible limitation on the scope of the disclosed ranges. Accordingly, the description of a range should be considered to have specifically disclosed all the possible sub-ranges as well as individual numerical values within that range. For example, description of a range such as from 1 to 6 should be considered
5 to have specifically disclosed sub-ranges such as from 1 to 3, from 1 to 4, from 1 to 5, from 2 to 4, from 2 to 6, from 3 to 6 etc., as well as individual numbers within that range, for example, 1, 2, 3, 4, 5, and 6. This applies regardless of the breadth of the range.

10 It will be apparent that various other modifications and adaptations of the application will be apparent to the person skilled in the art after reading the foregoing disclosure without departing from the spirit and scope of the application and it is intended that all such modifications and adaptations come within the scope of the appended claims.

Reference Numerals

	100,100 ^I ,100 ^{II} ,100 ^{III} ,100 ^{IV}	grip-twist control device
	101,101 ^{III} ,101 ^{IV}	housing body
	103,103 ^{II} ,103 ^{III}	annular disc
5	105,105 ^{IV} ,105 ^V	rotating part
	107,107 ^{III} , 107 ^{IV} ,107 ^V	ring
	109,109 ^{IV}	cylindrical extension
	111	housing annulus
	113	recess
10	115,115 ^{III}	cable retainer
	116,116 ^{II} ,116 ^{III}	annular magnet
	117,117 ^{IV}	protrusion
	118,118 ^{II}	circular dimple
	119,119 ^{IV}	retaining profile
15	120,120 ^{II}	concentric groove
	121,121 ^{IV}	securing profile
	123,123 ^V	groove
	125,125 ^V	collar
	127	outside diameter
20	129	inner hollow cavity
	131	circular tool
	133	annular ring
	135	retainer spring
	137,137 ^{III} ,137 ^{IV} ,137 ^V	grip part
25	139	edge of cable hanger
	141,141 ^{III}	cable hanger
	143	knob
	145	angulated rim