

"DEVICE FOR THE AUTOMATIC OPENING AND CLOSING OF A TOP BOX OR A SUITCASE FOR MOTORCYCLES AND FOR HOOKING AND RELEASING SAID SUITCASE OR TOP BOX TO/FROM THE MOTORCYCLE"

5

DESCRIPTION

FIELD OF THE INVENTION

The present invention relates to a device capable of allowing both the automatic opening and closing of a top box or a suitcase for motor vehicles, and the
10 coupling and releasing of such top box or suitcase with respect to a support structure, generally a special plate, solidly fixed to the motor vehicle.

For the sake of brevity, hereinafter reference will be made to the use of the device in association with a top
15 box, typically and as known, positioned on a specific luggage carrier structure provided integrally with the vehicle, however the entire description is intended as referring to any type of suitcase, also soft, also lateral, intended to be connected to a fixed support
20 which is integrally connected to the vehicle in turn.

The device according to the invention makes it possible to both simultaneously operate on the means adapted to allow the opening/closing of the top box and on the means adapted to allow the coupling/releasing of the
25 top box from the support element, and to selectively operate only on the means for opening/closing the top box, without operating on the means for coupling/releasing the top box from the support element.

30 A further feature of the device according to the present invention is that it can be operated remotely, without the use of the key commonly used to operate the

lock.

STATE OF THE ART

The use of top boxes, suitcases or bags in the field of motorcycles which are adapted to house luggage, helmets
5 or other accessories is known, which are removably fixed to a dedicated support element provided on the vehicle, for example a rear luggage rack or a supporting frame for side suitcases.

A top box is usually associated with a luggage rack
10 provided in the rear area of the vehicle behind the seat, while bags and luggage are generally associated with support frames still provided in the rear area, but in the lateral area of the vehicle, according to known aspects.

15 In both cases special support elements are generally provided, consisting for example of a support plate.

This support plate is stably fixed to the luggage carrier or to another structure of the same motor vehicle, and the top box/bag/suitcase is generally
20 provided with hooking means for hooking to said support plate.

Usually said hooking means are suitable for creating a removable coupling of the top box/suitcase with the support plate, and are provided at the lower face of
25 the top box/suitcase, which can be made of either plastic or metallic material or in other suitable materials.

The hooking means normally comprise a sliding latch element, able to engage with a special projection
30 provided in the support plate to firmly constrain the top box/suitcase to the plate itself.

A button release mechanism, possibly fitted with a

safety lock, makes it possible to retract the latch to release the top box/suitcase from the relative support plate.

5 A suitcase or top box for motor vehicles equipped with a device capable of carrying out both the opening and closing of the top box itself, and of obtaining its coupling and releasing with respect to a support element integral with the motor vehicle, is described for example in patent no. EP2242677 in the name of the
10 same applicant.

The same applicant is also the holder of the European patent EP2630026 which relates to a lock device able to perform both the opening and closing of a suitcase for motor vehicles, and to obtain the coupling and
15 releasing of such suitcase with respect to a fixed portion of the motor vehicle, which is able to simultaneously operate the opening/closing and the releasing/coupling, which presents an extremely simple, economical and particularly functional configuration.
20 In an alternative embodiment also described in EP2630026, the actuation is also provided by means of an electromagnetic actuator which can be actuated for example by radio or infra-red waves.

However, such devices of known type are not free from
25 drawbacks.

More particularly, the known devices do not allow selective operation wherein only the opening/closing of the top box or suitcase is operated without simultaneously also operating the coupling/releasing of
30 the top box/suitcase from the support.

SUMMARY OF THE INVENTION

The aim of the present invention is therefore to

provide a device for opening/closing and coupling/releasing a top box or a suitcase of a motor vehicle capable of operating according to a selective drive wherein only the opening/closing of the top box
5 or suitcase is operated without simultaneously operating the coupling/releasing of the top box/suitcase from the support.

Within this aim, an object of the present invention is to provide a device for opening/closing and
10 coupling/releasing a top box or a suitcase for a motor vehicle capable of carrying out both the opening and closing of said top box/suitcase, and to obtain the coupling and releasing of such top box/suitcase with respect to a fixed portion of the motorcycle, which is
15 able to solve the drawbacks affecting the devices of a known type from the prior art and which is suitable to allow the user to open the suitcase also without having to use a key.

Another object of the invention is to provide an
20 integrated device for opening and closing a top box or suitcase for motorcycles, as well as for the coupling and releasing of such top box or suitcase to/from the motor vehicle, which can be operated remotely using a radio wave, infra-red or Bluetooth remote control.

25 These objects according to the present invention are achieved by a device for opening/closing a top box or a suitcase for motor vehicles, as well as for coupling and releasing such top box/suitcase with respect to the motor vehicle, according to what is stated in claim 1.

30 **LIST OF FIGURES**

The characteristics and advantages of the device for opening/closing a top box or suitcase for motorcycles,

as well as for the coupling and releasing of such top box/suitcase with respect to the motor vehicle according to the present invention, will become more readily apparent from the following detailed
5 description, provided by way of non-limiting example, referred to the accompanying schematic drawings in which:

- figure 1 shows an overall perspective view of a portion of a top box or suitcase applied to a
10 support element and provided with a closing/opening and coupling/releasing device according to the present invention;
- figure 2 shows a detailed view of the portion of figure 1;
- 15 - figure 3 shows an exploded view of the opening/closing and coupling/releasing components of the device according to the present invention;
- figure 4 shows an internal view of the portion of figure 1 with the device according to the present
20 invention in a first operating configuration;
- figure 5 shows a side section view according to a transverse plane of the view of figure 4;
- figure 6 shows an internal view of the portion of figure 1 with the device according to the present
25 invention in a second operating configuration;
- figure 7 shows a side section view according to a vertical plane of the view of figure 6;
- figure 8 shows an internal view of the portion of figure 1 with the device according to the present
30 invention in a third operating configuration;
- figure 9 shows a side section view according to a vertical plane of the view of figure 8.

DETAILED DESCRIPTION OF THE INVENTION

The attached figures show exploded views and overall views of the opening/closing device of a top box **10** for motorcycles and for coupling/releasing such top box **10**
5 with respect to a support element **18**, for example a plate, in turn connected to a motor vehicle.

The present invention will hereinafter be illustrated with reference, by way of example, to a top box **10** for motor vehicles which comprises a lower shell **12** forming
10 the body of the top box **10** and an upper shell **14** forming the top box **10** cover, said upper shell **14** being hinged to the lower shell **12**.

It is however understood that the device according to the present invention can also be applied in
15 association with a suitcase or bag, in particular for motor vehicles, however configured.

According to what is known from the state of the art, on the bottom portion **16** of the lower shell **12** of said top box **10**, reversible constraining means to a support
20 plate **18** fixed to the motorcycle are provided.

A plate **20** is associated with the outer surface of the lower shell **12**, on which the following is formed:

- a first button **22** for releasing the top box from the support plate **18**, operatively connected to said
25 reversible constraining means;
- a second button **24** for opening the upper shell relative to the lower shell, operatively connected to coupling means **36**, **38** hinged to the plate **20** and able to selectively engage a corresponding coupling means **42**
30 integral with the upper shell **14**.

A lock block **26** is also associated with said plate **20**.

The device according to the present invention further

comprises:

a first under-lock body **82** rigidly rotatably constrained to said lock block **26** and which can be rotatably actuated to switch from a configuration of simultaneously locking said first button **22** and said second button **24** to a configuration of simultaneously unlocking said first button **22** and said second button **24** and vice versa;

a second under-lock body **83** which can be rotatably actuated to switch from a configuration of locking said second button **24** to a configuration of unlocking said second button **24** and vice versa.

According to the preferred embodiment of the present invention illustrated here by way of example, the first under-lock body **82** is configured to drag said second under-lock body **83** in rotation in the transition from said simultaneous locking configuration of said first button **22** and of said second button **24** to said simultaneous unlocking configuration of said first button **22** and of said second button **24**.

The first under-lock body **82** is connected directly to the lock block **26** therefore, turning the key **28** by 90° causes an equal rotation of the under-lock body **82**.

Below the first under-lock body **82** the second under-lock body is mounted **83**, which is coupled to the cylindrical part of the key seat **89** machined directly on the hinge plate **20**.

Attaching the first under-lock body **82** to the key group, the position of the second under-lock body **83** also locks along the key axis, which as such can only rotate around the seat **89**.

The first under-lock body **82** advantageously comprises a

radially projecting tooth **90** from said first body and configured to engage with a corresponding tooth **50** formed on said first button **22**. When the tooth **90** of said first under-lock body **82** engages said tooth **50** of
5 said first button **22**, the actuation of said first button **22** is prevented. More precisely, the translation that allows the unlocking of the top box **10** from the support plate **18** is prevented.

Likewise, said first under-lock body **82** further
10 comprises a radially projecting hook **91** adapted to be inserted inside a seat **920** formed in a radially projecting portion **92** of said second under-lock body **83** so that in the transition from said simultaneous locking configuration of said first button **22** and of
15 said second button **24** to said simultaneous unlocking configuration of said first button **22** and of said second button **24**, said first under-lock body **82** drags said second under-lock body **83** in rotation thanks to the relative constraint created between said first **82**
20 and second under-lock body **83** by said hook **91** which is inserted within said seat **920**.

It is not possible to open the top box **10** when the radially projecting portion **92** of the second under-lock body **83** engages with the lower end **56** of the coupling
25 means lever **36**, as the straight movement of the second button **24** prevents the opening of the upper shell with respect to the lower shell, and consequently the rotation of the hooking tooth **38** is prevented and thus the opening of the top box.

30 The operation of the device according to the present invention is as follows.

In order to open the top box and/or release it from the

plate, it is possible to turn the key **28** 90° with respect to the position shown in Figure 5, thus arriving in the rotated key configuration shown in figure 7.

5 Rotating the key causes the rotation of the first under-lock body **82** and, consequently, the insertion of the upper hook **91** in the seat **920** formed in said radially projecting portion **92** of the second under-lock body **83**, so that the first under-lock body **82** drives
10 said second under-lock body **83** in the position shown in figures 6 and 7.

In this configuration there is no interference between the shaped radial portion **92** and the lower end **56** of the coupling means lever **36**, and it is therefore
15 possible (by pressing) to move the second button **24**, thereby opening the top box.

At the same time, in this configuration there is no interference between the lower radial tooth **90** of said first under-lock body **82** and the tooth **50** of said first
20 release button **22**, therefore it is possible (by pressing) to move said first button **22** and release the top box from the support element or plate **18**.

Advantageously, the device according to the present invention further comprises actuating means **8** adapted
25 to actuate said second under-lock body **83** in rotation to allow the passage from said locking configuration of said second button **24** to said releasing configuration of said second button **24** and vice versa, thereby allowing only the opening/closing of the top box **10**
30 without simultaneously controlling said first coupling/releasing button **22**. The device according to the present invention therefore not only makes

simultaneous actuation possible by means of the action on the key **28**, of both buttons, the first opening/closing button **22** and the second coupling/releasing button **24**, but also the selective
5 actuation of only the first opening/closing button **22** of the top box.

More preferably, said actuating means **8** of said second under-lock body **83** comprise a circular rack **93** perimetally obtained around a portion of said second
10 under-lock body **83** engaging with a pinion **85** actuated by a motor **84**, preferably an electric motor connected to an electronic control unit **86**.

The electric motor **84** and the electronic control unit **86** can advantageously be powered by special batteries
15 housed near the motor itself, or directly by the battery of the motor vehicle through a special connection system.

To operate the motor **84** which controls said second under-lock body **83** it is advantageous to use a remote
20 control, or an application (a dedicated App) for smartphones, which can be used to send the opening command to the electronic control unit **86** which controls the rotation of the electric motor **84** which through the pinion **85** connected to it generates the
25 rotation of the second under-lock body **83**, which is arranged in the opening configuration of the top box illustrated in figures 8 and 9.

In this configuration there is no interference between the shaped radial portion **92** of the second under-lock
30 body **83** and the lower end **56** of the lever **36**, and pushing the second button **24** makes it possible to open the top box while the interference between the tooth **90**

of said first under-lock body **82** and the tooth **50** of the first button **22** is preserved, therefore it is not possible to move the first button **22** by pressing it and release the top box.

5 For safety reasons, the release of the top box from the motorcycle can only be done with the use of the key. The return of the device to the top box's closed position can be carried out by sending the closing command to the electronic control unit **86**, thereby
10 generating a reverse rotation of the electric motor **84**, and therefore of the pinion **85** and of the second under-lock body **83**, until returning to the closed configuration shown in figure 4.

From an electronic point of view, the presence of a
15 Bluetooth connection, which is one of the preferred configuration features of the device according to the present invention, makes it possible to generate a predisposition for automatic opening when, for example, the remote control or smartphone come into the
20 reception range of the electronic control unit **86**.

For this purpose, preferably said electronic control unit **86** comprises a communication module configured to detect the presence of a mobile terminal within a predetermined distance, and to subsequently control
25 said actuating means **8** so as to allow said second button **24** to be unlocked.

Taking advantage of the Bluetooth communication protocol that establishes a connection between the device and the mobile terminal, when the terminal,
30 constituted for example by a remote control or more preferably by a smartphone, leaves the reception range of the control unit, the latter can be programmed to

operate the automatic closure of the top box.

By adjusting the sensitivity of the reception systems, the distances and the methods of implementation can be managed.

5 An object of the present invention is therefore also a system for opening/closing and coupling/releasing a top box or suitcase for motorcycles, comprising:

- an opening/closing and coupling/releasing device as described previously;

10 - a mobile terminal comprising an electronic unit configured to communicate with said device by means of a wireless communication protocol.

Advantageously, the electronic unit of said mobile terminal is programmed to send an opening/closing
15 command signal of said top box or suitcase to said device by means of said wireless communication protocol.

As mentioned, advantageously said electronic unit is a smartphone. Preferably, said smartphone will be
20 programmable by means of a dedicated software application (a App).

Preferably, moreover, the device according to the present invention can be provided with visual signalling means of the state of the device itself. For
25 example, the device can comprise a plurality of LED lights configured to indicate the closure status through the indication of LED lights **80, 81**.

Advantageously, the visual signalling means **80, 81** can comprise a red LED **80** to indicate a closed condition of
30 the top box and a green LED **81** to indicate an open condition of the top box.

Preferably, a flashing red LED **80** condition can

indicate a malfunction of the device.

In the case wherein, for any reason, the actuating means **8** adapted to actuate said second under-lock body **83** in rotation and comprising the electric motor **84** are
5 blocked or do not function correctly when the top box is open (open configuration shown in figures 8 and 9), it is however possible to manually close the top box by rotating the second under-lock body **83**, inserting the key **28** and rotating it 90° so that the rotation of the
10 first under-lock body **82** is generated until the upper hook **91** of said first under-lock body **82** fits in the seat **920** formed in a radially projecting portion **92** of said second under-lock body **83**. At this point, bringing the key **28** back to the closed position, the said first
15 under-lock body **82** is returned to a closed position, returning to the closed and locked top box configuration visible for example in figures 4 and 5.

From the above description, the characteristics of the opening/closing device of a top box/suitcase for
20 motorcycles and of coupling/releasing such top box/suitcase with respect to a support structure connected to a motor vehicle according to the invention are clear.

It is also understood that the opening/closing and
25 coupling/releasing device of a top box/suitcase for motor vehicles according to the present invention is susceptible to modifications and variations, all of which are within the scope of protection identified by the attached claims, which form an integral part to the
30 descriptive text.

Furthermore, the details provided by way of example can be substituted by technically equivalent elements

falling within the scope of protection attributable to the invention.

CLAIMS

1. A device for opening/closing a top box or a suitcase (10) for motorcycles and for coupling/releasing such top box/suitcase relative to a support structure fastened to the motorcycle, said top box/suitcase comprising a lower shell (12), forming the top box body (10), and an upper shell (14), forming the cover of the top box (10) and which is hinged to the lower shell (12), on the bottom portion (16) of the lower shell (12) reversible constraining means to a support element (18) being provided fastened to the motorcycle and a plate (20) being associated on the outer surface of the lower shell (12), on which plate the following is obtained:
- a first button (22) for releasing the top box from the support plate, operatively connected to said reversible constraining means,
 - a second button (24) for opening the upper shell relative to the lower shell, operatively connected to coupling means (36, 38) hinged to the plate (20) and able to selectively engage a corresponding coupling means (42) integral with the upper shell (14); and
 - a lock block (26),
 - a first under-lock body (82) rigidly rotatably constrained to said lock block (26) and which can be rotatably actuated to switch from a configuration of simultaneous lock of said first button (22) and said second button (24) to a configuration of simultaneous unlock of said first button (22) and said second button (24) and vice versa;
 - a second under-lock body (83) which can be

rotatably actuated to switch from a configuration of locking said second button (24) to a configuration of unlocking said second button (24) and vice versa, characterised in that said first under-lock body (82) is configured to drive in rotation said second under-lock body (83) while switching from said configuration of simultaneous lock of said first button (22) and said second button (24) to said configuration of simultaneous unlock of said first button (22) and said second button (24).

2. Opening/closing and coupling/releasing device according to claim 1, characterised in that said first under-lock body (82) comprises a radially projecting tooth (90) configured to be engaged with a tooth (50) of said first button (22) to prevent said first button (22) from being actuated.

3. Opening/closing and coupling/releasing device according to one or more of the previous claims, characterised in that said first under-lock body (82) comprises a radially projecting hook (91) adapted to be inserted inside a seat (920) formed in a radially projecting portion (92) of said second under-lock body (83) in such a way that while switching from said configuration of simultaneous lock of said first button (22) and said second button (24) to said configuration of simultaneous unlock of said first button (22) and said second button (24) said first under-lock body (82) drives in rotation said second under-lock body (83).

4. Opening/closing and coupling/releasing device according to one or more of the previous claims, characterised in that it comprises actuating means

(8) adapted to rotationally actuate said second under-lock body (83) to allow the switching from said configuration of locking said second button (24) to said configuration of unlocking said second button (24) and vice versa.

5 5. Opening/closing and coupling/releasing device according to one or more of the previous claims, characterised in that said actuating means (8) comprise a circular rack (93) perimetally obtained
10 around a portion of said second under-lock body (83) engaging with a pinion (85) actuated by a motor (84).

 6. Opening/closing and coupling/releasing device according to one or more of the previous claims,
15 characterised in that said actuating means (8) further comprise an electronic control unit (86) which can be remotely controlled.

 7. Opening/closing and coupling/releasing device according to the previous claim, characterised in
20 that said electronic control unit (86) comprises a communication module configured to receive an opening/closing command by means of a wireless communication protocol.

 8. Opening/closing and coupling/releasing device
25 according to the previous claim, wherein said communication protocol is the Bluetooth protocol.

 9. Opening/closing and coupling/releasing device according to claim 7 or 8, characterised in that
30 said communication module is configured to detect the presence of a mobile terminal within a predetermined distance and to subsequently control said actuating means (8) so as to allow said second

button (24) to be unlocked.

10. Opening/closing and coupling/releasing device according to one or more of the previous claims, characterised in that it further comprises, at least
5 a pair of LED lights (80, 81) of different colour each suitable to signal one status of said device, configured to be placed outside of said top box or suitcase (10) with which said device is associated, and in a visible position.
- 10 11. System for opening/closing and coupling/releasing a top box or suitcase for motorcycles, comprising:
- an opening/closing and coupling/releasing device according to one or more of claims from 6 to 10;
- a mobile terminal comprising an electronic unit
15 configured to communicate with said device by means of a wireless communication protocol.
12. System according to claim 11, wherein said electronic unit of said mobile terminal is programmed to send an opening/closing command signal
20 to said device by means of said wireless communication protocol.
13. System according to claim 11 or 12, wherein said electronic unit is a smartphone.