

THE PATENTS ACT 1977

IN THE MATTER of
European Patent (UK)
No. 0227507
of HERMES

I, RITA GOLDMAN, of Frank B. Dehn & Co.,
39 Old Steine, Brighton, hereby declare that I
am conversant with the French and English languages
and that to the best of my knowledge and belief the
attached document is a true and correct translation
of the original text of European Patent (UK) 0227507
No. in the name of HERMES

Signed this 14th day of July 1989

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The present invention relates to locking devices, in particular for luggage, according to the preamble of claim 1. A device of this kind which, however, is used for locking doors is known from BE-A-745682. The preamble of claim 1 has been formulated on the basis of this document.

Locking devices for luggage of the aforementioned type are known, which comprise a latch, commonly known as a clasp, fixed to the lid of the luggage and a keeper fixed to the part of the luggage which defines its inner volume. The clasp is provided with a loop which, in the closed position, is introduced into the opening of the keeper where it is retained by a pin which is connected to that keeper and extends through the loop.

Such a device is opened conventionally by means of a button which causes the pin to be withdrawn from the loop, the clasp being associated with resilient means which automatically extract the loop from the keeper as soon as the pin has been retracted.

In order to close the luggage, the user must first of all put down the lid and then, by exerting a pressure on the clasp, introduce the loop into the opening of the keeper, the pin provided in the latter resiliently withdrawing under the effect of the pressure exerted by the introduction of the loop so as to retain it as soon as it is introduced into the keeper and thus close the device.

The opening and closing of luggage with such a device therefore require various operations which comprise, on the one hand, acting on the control means for releasing the clasp and, on the other hand, putting down the lid and then the clasp so as to force the loop carried by the clasp into the keeper.

An object of the invention is to overcome this drawback by providing a locking device in which the number of operations required for effecting the opening and closing, for example of the luggage on which it is mounted, is very small.

The invention therefore provides a locking device for immobilizing two elements relative to each other, one of which is movable relative to the other, comprising a bolt intended to be mounted on one of the elements and a keeper to be mounted on the other element, the keeper comprising a displaceable retaining element provided with means for engaging the bolt, and a control element, the retaining element being mounted to be slidable along an axis counter to a resilient return element to a disarmed position, characterised in that the retaining element is, moreover, when released, mounted to be pivotable about the axis under the action of the resilient return element, and in that the bolt, so long as it is located in the keeper, constitutes an axial abutment means for the retaining element in the disarmed position, after the pivoting of the latter

about the axis, the bolt further constituting, when it is disengaged from the keeper, means for automatically resetting the retaining element.

The invention also provides an article, in particular luggage, consisting of two body parts, characterised in that it comprises at least one locking device such as defined hereinbefore, each bolt being mounted on one of said body parts, and each keeper being respectively mounted on the other body part.

According to another feature of the luggage, there is provided, on at least one portion of the corresponding peripheral edge of at least one of said body parts, a resilient element intended to be elastically compressed when the or each locking device is closed.

The invention further relates to a closure installation, in particular for a building opening, comprising a section mounted to be slidable substantially parallel to a second section, characterised in that it comprises at least one locking device as defined hereinbefore, each bolt being mounted on one of said sections and each associated keeper being mounted on the other of said sections.

A better understanding of the invention will be had from the following description of an embodiment which is given by way of example with reference to the accompanying drawings, in which:

Fig. 1 is a perspective general view of a partially open, small case, provided with two locking devices according to the invention;

Fig. 2 is an exploded perspective view, to an enlarged scale, of the locking device of the invention;

Fig. 3 is an elevation view, with a part cut away and to an enlarged scale, of a locking device of Fig. 1, as seen from the interior of the case, this device being in the closed and locked position;

Fig. 4 is a sectional view along line 4-4 of Fig. 3;

Fig. 5 is a view similar to Fig. 3, the device being unlocked and the retaining means of the device being in the retracted or disarmed position behind the bolt;

Fig. 6 is a sectional view along line 6-6 of Fig. 5, and

Fig. 7 is a view similar to Figs. 4 and 5, the retaining means being in the active or armed position in the open device.

The small case, illustrated in Fig. 1, comprises a lid 1 hinged to a part 2 which defines the actual inner volume of the case. On the side of the case opposite that on which the lid 1 and the part 2 are hinged together, two closing devices according to the invention are disposed near each end of this side of the case.

Fig. 1 shows that each closing device comprises a keeper 3 mounted on the part 2 of the case and a bolt 4 mounted inside the lid 1 of said case by two screws 4a

(Fig. 3), this bolt being intended to penetrate an opening 5 in the associated keeper 3 when the device is closed.

Each keeper 3 further comprises a housing 6, defining the opening 5, fixed inside the case, and a front plate 7 fixed to the outside of the case by three screws 8a which extend through the housing 6 and the corresponding wall of the part 2 of the case and engage in tapped studs 8 (Fig. 2) so that the housing 6 and the associated front plate 7 are fixed together.

It will be observed that each closing device is provided with means for controlling the opening of this device in the form of a push-button 9, which extends, in the closed position of the device, through the bottom of a cavity 10 provided on the front plate 7 and projects outside the case.

In order to be able to lock each device in the closed position, each front plate 7 is provided with a barrel lock 11 located in the vicinity of the cavity 10.

Reference will now be made more particularly to Figs. 2, 3 and 5 in which the inner structure of the keeper 3 is illustrated in detail.

The push-button 9 is in the form of a tube closed at its outer end. This button is mounted to be rotatable and movable in translation on a sleeve 9a carried by an element 12 for retaining the associated bolt 4. The button 9 is moreover provided at its inner end, in the vicinity of the retaining element, with an annular flange 9b which extends radially outwardly, this annular flange 9b being intended to abut against the periphery of the orifice provided in the bottom of the cavity 10 and through which the push-button extends, so that the latter cannot be separated from the keeper 3 by pulling on the part thereof which projects out of the keeper.

The sleeve 9a and the retaining element 12 are mounted to be rotatable and movable in translation on a rod 13 provided inside the housing 6, this rod extending through the retaining element so that the rod, the sleeve 9a and the push-button 9 are in alignment on a common axis. A coil spring 14 is, moreover, wound round the rod 13 between the retaining element 12 and the adjacent wall of the housing. This spring 14 is mounted, on the one hand, to be axially compressed so as to bias the retaining element 12 and the sleeve 9a toward the front plate 7 and, on the other hand, to be put under torsional stress so as to bias the retaining element 12 to an active or armed position in the extension of the opening 5 (Fig. 7).

In order to put the spring 14 under torsional stress, one end, 14a, of the spring is retained by an inner boss 15 on the housing 6 through which boss a screw for fixing the keeper extends, the other end, 14b, of the spring being inserted into a slot 16 provided in the retaining element 12 and bearing against the edge of this slot.

In order to allow the retaining element 12 and the associated bolt 4 to positively cooperate in the closed position of the device, the retaining element 12 and the bolt 4 are each provided with a hook, respectively 17, 18, intended to fit one inside the other (Fig. 3) when the case is closed.

The bolt 4 and the retaining element 12 are also each provided with a cam, respectively 19, 20, these cams being intended to permit, when they cooperate with each other, the rotation of the retaining element 12 about the axis of the rod 13 when the bolt 4 is inserted in the keeper 3, so as to bring the hooks 17 and 18 to a position in which they fit one inside the other and thus close the device.

The inner end of the barrel lock 11 is provided with a lug 21 intended to be placed, when the barrel is rotated by a key, behind the retaining element 12 so as to lock the device against opening by preventing any sliding of the retaining element 12 to its disarmed position.

The arrangement of the push-button, which is rotatable on the sleeve 9a, advantageously prevents, when the locking device is locked by the lug 21 disposed behind the retaining element 12, the pivoting of the latter and consequently the separation of the hooks 17 and 18, and the release of the bolt 4, should the part of the button 9 projecting out of the keeper be rotated.

The various steps in the operation of the locking device according to the invention will now be described, with reference to Figs. 3 to 7.

In the closed position of the device (Figs. 3 and 4), the bolt 4 is inserted into the keeper 3 through the opening 5 of the latter and the hook 17 of the retaining element is engaged in the hook 18 provided at the corresponding end of the bolt 4 so as to retain the latter and maintain the device closed. In this position, the lug 21 of the barrel lock 11 may be interposed between the housing 6 and the retaining element 12, as illustrated in Fig. 4, thus preventing any sliding of the push-button 9. It will be observed that, in this case in which the retaining element 12 is in the active position, the length of the push-button 9 and the depth of the cavity 10 are such that this button does not project beyond the cavity 10 of the front plate 7 so that, notwithstanding the fact that it presents a projecting portion capable of being depressed by the user, this push-button is completely retracted inside the cavity 10 and there is therefore no danger of the button being accidentally caught.

The device according to the invention is opened in two steps, illustrated respectively in Figs. 5, 6 and 7.

In the first step, the user unlocks the device (if the latter has been locked) by rotating the barrel lock 11 and depresses the push-button 9 counter to the resilient force exerted by the spring 14 in the axial direction of the rod 13. The depression of the button 9

causes the retaining element 12 to slide along the rod 13, thus separating the hooks 17 and 18 of this retaining element and the bolt 4. The retaining element 12, which then extends between the bolt 4 and the adjacent wall of the housing (Figs. 5 and 6), is made to pivot in the direction of the bolt by the torsional force exerted by the spring 14 in order to be placed in the retracted position between the bolt 4 and the adjacent side of the housing 6 of the keeper. When so placed, it abuts, on the one hand, against the bolt 4, counter to the axial force exerted by the spring 14, and, on the other hand, counter to the torsional force exerted by said spring 14, it abuts against the housing 6 by means of a portion 22 (Fig. 5) of the retaining element 12. The travel of the push-button 9 into the keeper 3 for bringing the retaining element 12 to its retracted position is such that this push-button 9 is itself fully pushed into the keeper 3 (Fig. 6) so as no longer to project from the cavity 10 of the front plate 7. This cavity 10 has a roughly spherical dome shape, which is advantageously adapted to the end of a finger of a user when the user depresses the push-button in order to open his case.

From this retracted or disarmed position of the retaining element 12, the bolt 4 can then be freely extracted from the keeper 3 by raising the lid 1 of the case. The extraction of the bolt 4 then eliminates the axial abutment provided by the spring 14 which thus simultaneously returns the retaining element 12 to its active position (Fig. 7) as soon as the bolt has left the keeper.

In this active position, the hook 17 of the retaining element projects in the extension of the opening 5 of the keeper 3, the retaining element being in axial abutment against the corresponding wall of the part 2 of the case and, angularly, against the housing 6 of the keeper 3 by its abutment portion 22, counter to the action of the torsional force exerted by the spring 14.

When this active or armed position of the retaining element 12 is reached (Fig. 7), the device may again be closed merely by closing the lid 1 of the case, which causes the bolt 4 to enter the opening 5 of the corresponding keeper 3 of the closing device. When the bolt 4 enters the keeper, the cam 19 on the bolt slides along the cam 20 on the retaining element which is thus caused to pivot on the rod 13 of the keeper, counter to the angular torsional force exerted by the spring 14 until the hooks 17 and 18 respectively provided on the retaining element and the bolt 4 are caused to engage each other, under the effect of the this same torsional force exerted by the spring 14 (Figs. 3 and 4).

Owing to the arrangement of its retaining means and the control element, this locking device of the invention advantageously permits an easy operation for opening or closing, for example the article of luggage

on which it is mounted. Indeed, to achieve this opening, it is sufficient merely to depress the push-button so as to disarm the retaining means, which remain in this position until the article of luggage is opened; the fact of swinging down the lid, and thus causing the bolt to enter the corresponding keeper, automatically results in the closure of the device and therefore of the article of luggage. The opening of the latter is thus achieved with only one hand in two stages and its closure is achieved with one hand in one stage.

In order still further to simplify the operations on each locking device for opening the article of luggage and reduce them to a single operation effected with only one hand, it may be arranged that at least one part of the corresponding peripheral edge of the lid and/or of the part 2 of the case associated with the device of the invention be provided with a resilient element, for example of elastomer, adapted to be compressed between the lid 1 and the part 2 in the closed position of the case so that, as soon as the user retracts the retaining element 12 of each device of the invention provided on the case, the latter is automatically partly opened and causes each bolt 4 to be extracted from the associated keeper 3 under the effect of the resilient extension of the element which means that the user has no need to raise the lid 1 in order to extract the or each bolt 4 from the corresponding keeper.

Although the invention has been illustrated in respect of a case whose two body parts, which are hinged together, are intended to be immobilized relative to each other by means of locking devices of the invention, the latter may be used generally for immobilizing any two elements relative to each other, at least one of which is movable relative to the other.

Thus, the locking device according to the invention may be applied to any article comprising two body parts hinged together, or at least one of which is mounted to be slidable substantially parallel to the other, such as an article of luggage, in particular a suitcase or a trunk, or a piece of furniture, for example a piece of furniture having at least one flexible or rigid panel which is slidable to close an opening. The or each bolt provided is mounted in the vicinity of an edge of a first panel and the or each corresponding keeper is mounted in the vicinity of the corresponding edge of a second panel in such manner that, by a sliding of the or each panel for closing the opening, each keeper cooperates with the associated bolt for immobilizing these two panels relative to each other.

Some pieces of furniture whose opening is adapted to be closed by one or two slidable screens, in particular a desk, may also be provided with at least one locking device for immobilizing the or each screen in its closed position. In these articles, a resilient element or like resilient means may be provided on the

corresponding edge of at least one of the panels or screens so as to automatically separate the latter when the or each locking device is opened.

Although the invention relates to the aforementioned articles, it also relates to closure installations, in particular for an opening of a building separating two premises of the latter, comprising a flexible or rigid section, mounted to be slidable substantially parallel to another flexible or rigid section and optionally itself mounted to be slidable substantially parallel to the first section.

As described before, the or each bolt of the locking device is mounted in the vicinity of an edge of a section and the or each corresponding keeper is mounted in the vicinity of the corresponding edge of the second section so that, by a sliding of the or each section, each keeper cooperates with the respective bolt so as to immobilize these sections relative to each other. A resilient element or other like means may be, moreover, provided on the corresponding edge of at least one of the sections so as to automatically separate them when the or each locking device is opened.



CLAIMS

1. A locking device for immobilizing two elements (1, 2) relative to each other, at least one of which is movable relative to the other, comprising a bolt (4) intended to be mounted on one of the elements and a keeper (3) intended to be mounted on the other of said elements, the keeper comprising a displaceable retaining element (12) provided with means for engaging the bolt (17), and a control element (9), the retaining element (12) being mounted to be slidable along an axis counter to a resilient return element (14) to a disarmed position, characterised in that the retaining element is, moreover, when released, mounted to be pivotable about said axis under the action of said resilient return element and in that the said bolt, so long as it is located in the keeper (3), constitutes axial abutment means for the said retaining element in the disarmed position after the pivoting of the latter about said axis, the said bolt further constituting, when it is disengaged from the keeper, means for automatically resetting the retaining element (12).
2. A device according to claim 1, wherein the retaining element (12) comprises a portion (22) for limiting the pivoting thereof.
3. A device according to claim 1, wherein the resilient return element is a coil spring (14) which is mounted so to be axially compressed and under torsional stress.
4. A device according to any one of the preceding claims, wherein the control element comprises a push-button (9) adapted to project out of the keeper, at least in the closed position of the device.
5. A device according to claim 4, characterised in that it comprises a sleeve (9a) connected to the retaining element and mounted to be rotatable and movable in translation on a rod (13) fixed to the keeper, the push-button (9) itself being rotatably mounted on the sleeve (9a).
6. A device according to claim 4 or 5, characterised in that the push-button extends through the bottom of a cavity (10) formed on the outer face of the keeper, the length of the push-button and the depth of the cavity being such that, in the active position of the retaining means, the push-button does not project out of the cavity.
7. A device according to any one of the preceding claims, characterised in that it is provided with means for locking the retaining means in the closed position of the device.
8. A device as claimed in claim 7, characterised in that the locking means comprise a lock controlling



the displacement of a lug (21) intended to oppose, in the locked position, the sliding of the retaining element (12) toward its displaced position.

9. An article, in particular an item of luggage, comprising two body parts (1, 2), characterised in that it comprises at least one locking device as claimed in any one of the preceding claims, each bolt being mounted on one of said body parts and each respective keeper being mounted on the other body part.

10. An article according to claim 9, characterised in that, on at least one portion of the corresponding peripheral edge of at least one of the body parts, there is provided a resilient element intended to be elastically compressed when the or each locking device is closed.

11. A closure installation, in particular for a building opening, comprising a section mounted to be slidable substantially parallel to a second section, characterised in that it comprises at least one locking device according to any one of the preceding claims, each bolt being mounted on one of said sections and each associated keeper being mounted on the other of said sections.