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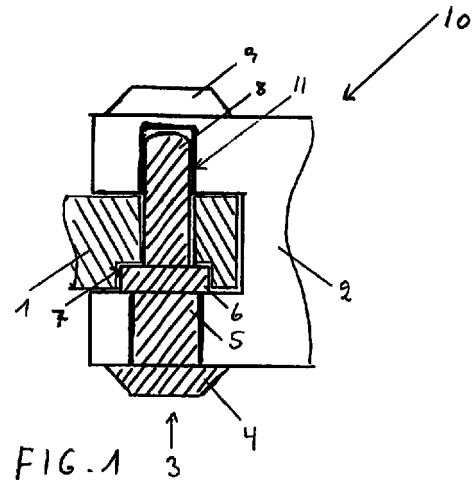
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(54) **Coupling device/combined lock and hinge**

(57) The current invention corresponds to a coupling device between a wall opening and a cover element, wherein the coupling device has a first coupling element (1) connected to said wall opening and a second coupling element (2) connected to said cover element, and an axle (3) mounted in holes (11) in said coupling elements (1, 2) to connect said two coupling elements (1, 2). The axle (3) comprises a mortise lock (5).



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Description

[0001] The present invention relates to a coupling device between a wall opening and a cover element, wherein said coupling device comprises a first and a second coupling element and an axle connecting said first and second coupling element, said first coupling element being connected to said wall opening and said second coupling element being connected to said cover element. The invention also relates to use of such a coupling element.

[0002] Generally, pivoting cover elements, for example gates, doors, or gratings, for wall openings are equipped with a set of hinges at one edge and a lock at the opposite edge. This limits the cover element to be able to pivot only around that axis which is located on that edge where the hinges are arranged. If a cover element should be changed from being pivotable around this axis to be pivotable around an axis at the opposite edge, a substantial rebuilding it is often necessary, or part of the cover element has to be replaced, for example the door panel. This is a severe disadvantage. Furthermore, this implies the unfavourable consequence that the cover element has to be manufactured in at least to versions.

[0003] Security gratings used to secure wall openings, gates, doors, and the like against break-in mainly are manufactured according to two principles.

[0004] According to one principle, gratings are put into a frame, when security is required, and are demounted from the frame in the remaining time. For instance, such a grating will be mounted in front of a door or likewise at night time to protect against break-in, whilst at day time, it will be taken down from the frame in order to allow eventual customers to have a free view to the goods that are displayed in the shop. In practice, such a grating typically is built with hooks engageable with corresponding sockets in the frame. After the grating has been placed in the frame, the grating can be secured against demounting by placing padlocks in the hooks such that the hooks are prevented from being pushed out of the sockets.

[0005] This kind of gratings has a number of disadvantages. Firstly, such a grating can be annoying for the person lifting the rather heavy grating off the sockets, if the person is not very strong. Secondly, it can be difficult to balance the grating during mounting when the grating has to be mounted in a number of sockets simultaneously. A further point of irritation for the shop keeper is the fact that the grating has to be demounted, even though the door has to be opened only for a very short moment.

[0006] The second kind of gratings are mounted pivotably, such that the grating, when required, opens and closes as a door. For example, such a grating in connection with a door in a shop will be swung against the wall to allow free view to the goods in the shop. Closing and opening is done quickly, and the shop

keeper does not feel a load in his back when the grating is placed in or taken out of the frame. But also this system has a number of draw-backs. The grating cannot be demounted completely from the frame in a simple manner, if this should be desirable. Furthermore, a grating constructed for a specific door cannot be used for a different door which opens at the opposite edge.

[0007] The object of the invention is to provide a pivotable coupling device for a cover element allowing in an easy and fast way to change between pivot edges without modifying the coupling element itself. Furthermore, it is an object of the invention that the coupling device in connection with a security grating facilitates the mounting and demounting of the grating from the frame.

[0008] This object is achieved with the present invention of the type as mentioned by way of introduction and characterised in that the axle comprises a mortise lock.

[0009] In principle, the coupling device according to the invention is a combination of a hinge and a lock for cover elements, for example a gate, a door or a grating. This coupling device mainly consists of an axle and two coupling elements, for example the fixed part and the pivoting part of a hinge. The axle is provided by a mortise lock, preferably with a safety key as known from safety locks in entrance doors, and any further mechanical parts in connection with the lock. After unlocking the lock, the axle is demounted from the coupling device, whereafter the two coupling elements are separated.

[0010] For example, a cover element can be mounted with four coupling elements, two on one edge and two on the opposite edge of the coupling element. If all four coupling elements are secured with locks as axles, the cover element is solidly fixed in the frame.

[0011] If two locks are demounted from the couplings elements at one edge, the coupling element can swing around an axis at the opposite edge. For example, the possibility to shift between the pivoting edges is a great advantage if changes in the interior arrangement of a room makes it necessary to open the door or grating at the opposite edge. Furthermore because of its simplicity, this universal coupling element is technically very favourable for production.

[0012] By demounting all locks, the cover element can be taken off the frame. Therefore, a security grating with coupling elements according to the invention not only has the advantages of a pivotable grating, but also the advantages connected with a grating that can be demounted from the frame in an easy manner.

[0013] Furthermore, a grating with coupling elements according to the invention does not need any space above the grating to be lifted off the frame. Therefore, the coupling elements open the possibilities for a more aesthetic favourable configuration than possible hitherto.

[0014] Because the lock is part of the axle in the coupling elements, the lock can be made as an integral

part of a hinge, which makes it scarcely visible. This is advantageous not only for aesthetic reasons, but also for security reasons when used in connection with a security grating, because a burglar attempting to break into a building at night may have difficulties to find the locks. A further safety factor against break-in is given by the construction as the mortise locks are well protected inside the coupling elements and only accessible from one end of the axle.

[0015] The lock as an axle can be constructed as a mortise lock with a collar engageable with a corresponding cavity in one of the coupling elements. To engage the coupling elements, the lock is inserted into a hole in the two coupling elements, whereafter the collar during the locking is rotated into the cavity inside the coupling device fixing the lock and, therefore, the axle in the coupling device.

[0016] Appropriately, one of the coupling elements has a fork-like section with two knuckles between which the other coupling element is placed. However, other embodiments are possible, for example configuring both coupling elements as forks with a number of knuckles, wherein the knuckles from one coupling element are engageable with the knuckles from the other coupling element.

[0017] To secure the coupling device against unauthorised demount from the frame, for example in the case of break-in, the coupling elements are fastened with a screw to a mount fixed to the frame such that this screw in the coupling device is covered by the axle and is only accessible from the outside, when the axle is demounted and the coupling elements separated. Instead of using screws, the coupling elements can be fastened with other means, for example by nails, by welding or by gluing.

[0018] To ease the initial mount of the coupling device on a frame in connection with the security grating, the frame has a bracket, within which a plate from one of the coupling elements can be slidably inserted, whereafter is its secured in a suitable position. This embodiment has a number of advantages. First, the frame does not need to be fabricated for every size of grating. The brackets for the frame can be fabricated by extrusion in materials as, for instance, polymer or aluminium, whereafter the lengths are adjusted to the grating at the place of assembly. After securing the brackets on the wall, or alternatively on a frame, the coupling element is mounted and fixed. This property of the coupling device according to the invention makes it possible to produce, store and adjust the brackets, the plates and frames in a cheap way.

[0019] Also, the coupling elements allow a production by extrusion, which is a cheap and fast production method.

[0020] The invention will hereafter be explained in more detail with reference to the accompanying drawings, where

FIG. 1 is a sectional view of the coupling device in one embodiment of the invention,

FIG. 2 is a cross section through one of the coupling elements in one embodiment of the invention, where the coupling element is fastened to a bracket in the frame,

FIG. 3 is a cross section through one of the coupling elements in another embodiment of the invention, where the coupling element is fastened to a bracket in the frame, and

FIG. 4 shows different cross sections through the coupling device 10.

[0021] FIG. 1 is a sectional view through the coupling device 10. Between the first coupling element 1 and the second coupling element 2, an axle 3 is mounted for coupling of the two coupling elements 1, 2. The axle has a cap 4, a mortise lock 5 with a collar 6 engageable with a corresponding cavity 7 in the first coupling element 1, and a cylindrical part 8 extending from the mortise lock 5. For reason of design, the coupling device is equipped with a second cap 9 which also functions to cover the axle 3, if the hole 11 extends completely through the other coupling element 2.

[0022] In the shown configuration, the coupling device 10 is in a locked state where the two coupling elements are coupled and cannot be separated. In this configuration, the coupling device 10 can be used as a hinge. For example, the first coupling element 1 is the fixed part of the hinge fixed to a frame while the other coupling element 2 is the pivoting part of the hinge connected to the cover element and pivoting around the axle 3.

[0023] By unlocking the lock by a key, preferably of the type as used in safety lock for entrance doors, the collar is turned 90°, whereafter the axle 3 can be taken out of the coupling device 10. Thereafter, the two coupling elements 1, 2 can be separated.

[0024] FIG. 2 is a cross section through the first coupling element 1 which has a central hole 12 and a cavity 7 for the collar 6 of the lock 5. The coupling element 1 is equipped with a dovetail profile 13 matching a dovetail groove 14 on a bracket 15 on the frame mounted to a wall. During the initial mount, the coupling element 1 is inserted into the groove 14 and positioned in the right position necessary for the mount of the cover element. Thereafter a screw 16, bolt or likewise is inserted into a transversal hole 17 and screwed through the winding 18 in the coupling element 1. The screw 16 is screwed so far through the winding 18 in the coupling element 1 that the tip 19 of the screw 16 is presses into the groove 14 fixing the coupling element 1 in place.

[0025] The advantage of the bracket 15 is that the position of the coupling element 1 can be adjusted according to the frame on the place of assembly and need not be produced especially for every particular size of cover element. The bracket 15 and also the frame can be produced from extruded profiles, which

are easy and cheap to fabricate, store and adjust.

[0026] FIG. 3 is a cross section of the first coupling element 1 in another embodiment of the invention with a recess 20 fitting a groove 21 in the bracket 15. A screw 16 bolt or likewise is screwed through transversal hole 17 into a winding 22 in an inner plate 23 in the bracket 15. The plate 23 is slideable in the bracket 15 at initial assembly until the screw 16 is screwed so far through the plate 23 that the tip of the screw is pressed into the bracket, which fixes the plate 23 end the coupling element 1. 5 10

[0027] This embodiment is aesthetically preferred because the plate 21 can be covered by a batten such that the bracket seems to be an integrated part of the frame and is very little conspicuous. 15

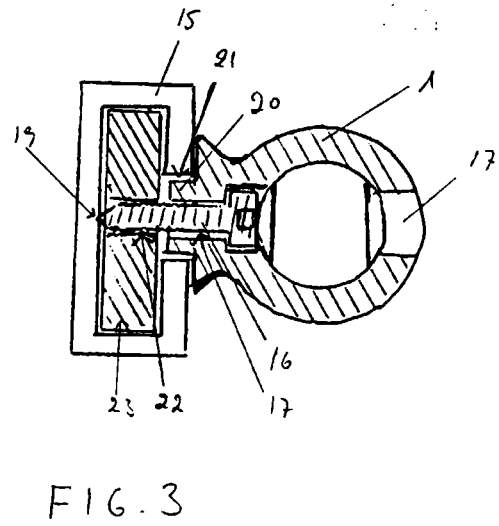
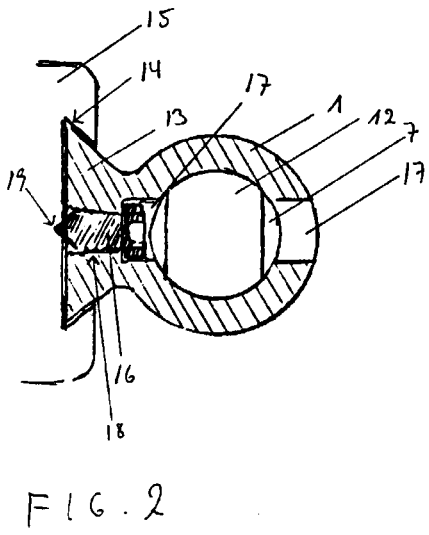
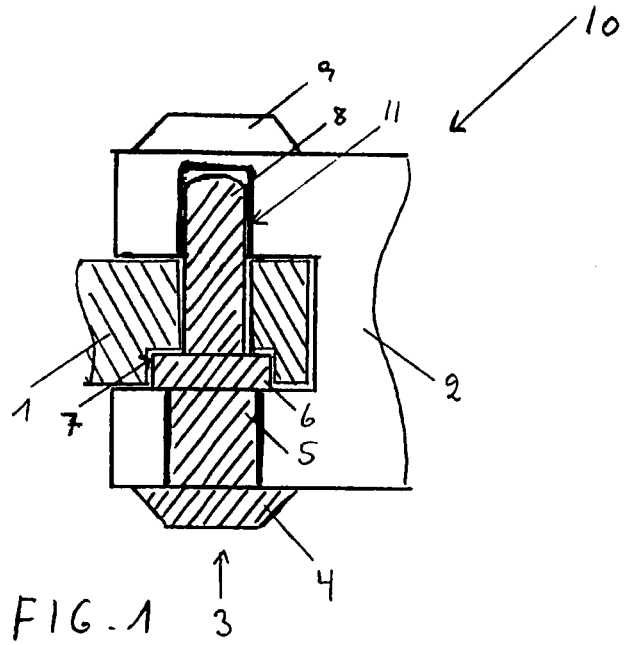
[0028] FIG. 4 shows different cross sections A-A, B-B, C-C, through the coupling device 10 as shown in FIG. 1. 20

Claims

1. Coupling device (10) between an opening in a wall and a cover element, wherein said coupling device comprises a first (1) and a second (2) coupling element and an axle (3) connecting said first (1) and second (2) coupling element, said first coupling element (1) being connected to said wall opening and said second coupling element (2) being connected to said cover element **characterised** in that said axle (3) comprises a mortise lock (5). 25 30
2. Coupling device (10) according to claim 1, **characterised** in that the axle (3) comprises a mortise lock (5) with a rotateable collar (6) engageable in a cavity (7) in the first (1) or in the second (2) coupling element and that the axle (3) comprises a cylindrical part (8) connected to and extending from the mortise lock (5). 35
3. Coupling device (10) according to claim 1 or 2, **characterised** in 40
 - that one of the first (1) and second(2) coupling element comprises a central section in the coupling device 10, 45
 - that the other of the first (1) and second (2) coupling elements comprises a fork-like section with two knuckles, each knuckle having a hole, the two holes being arranged in line,
 - that the central section is located between said two knuckles, and 50
 - that the axle (3) connects said central section with the two knuckles in the fork-like section.
4. Coupling device (10) according to claim 1 - 3, **characterised** in that one of the coupling elements (1, 2) by a joining member (16), preferably a screw, is secured to said cover element or secured to a 55

bracket (15) mounted to said wall, where the joining member (16) only is accessible, when the axle (3) is removed from the coupling device (10) and the second coupling element (2) is demounted from the coupling device (10).

5. Coupling device (10) according to claim 1 - 4, **characterised** in that the coupling device is secured to a mount mounted to said wall, where the mount comprises a plate (23) and a bracket (15), wherein said plate (23) is insertable into said bracket (15) mounted to said wall.
6. Cover element chosen from the group consisting of a gate, a door, a window and a grating with a coupling device (10) according to claim 1 - 5.
7. Use of a coupling device (10) according to claim 1 - 5 as a hinge in connection with a gate, door, window or security grating in a wall opening.



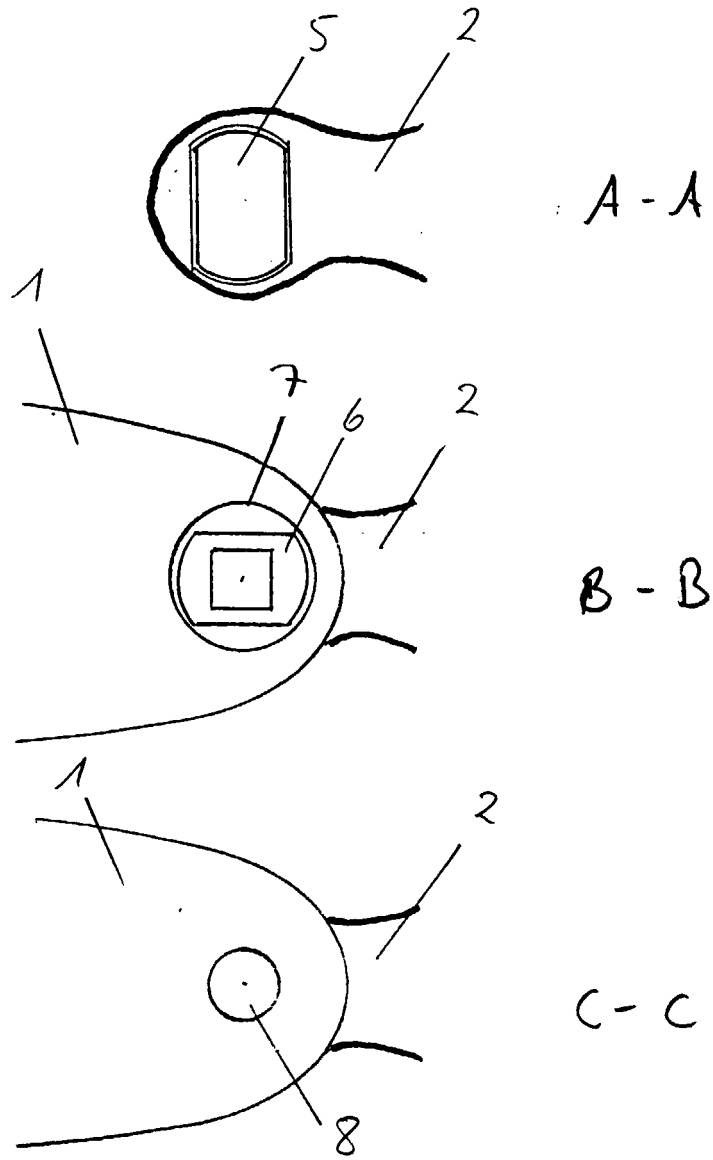


FIG. 4