

Flush-mounted electrical installation unit having a swing-out cover

The present invention relates to a flush-mounted electrical installation unit comprising a cover, seated in swing-out fashion on a housing, and locking means comprising a lockable retaining element for locking the cover in its closed position.

EP O 648 000 B1 discloses a flush-mounted electrical installation unit of the described kind, that is equipped with a cover pivotably joined to a protective frame. The cover comprises a movable cord outlet tube and in addition locking means for arresting it in its closed position. Arresting the cover is effected via a spring-loaded latch, that is mounted pivotably on the cover and that engages an eye provided on the protective frame, when the cover is moved into its closed position.

Now, it is the object of the present invention to provide a flush-mounted electrical installation unit of the before-mentioned kind whose cover is suited to perform the function of a cord outlet.

This object is achieved by the fact that at least two locked positions are provided for the retaining element in such a way that when the retaining

element is locked in its first locked position the cover occupies its closed position, and when the retaining element is locked in its second locked position the cover occupies its open position in which it serves as a cord outlet. This has the effect, on the one hand, to fix the cover in its closed position and, thus, to guarantee reliable protection for the installed electrical installation units, while on the other hand the cover can be locked also in a partially open position in which it serves as a cord outlet so that a separate cord outlet is rendered superfluous.

According to a further embodiment of the invention the retaining element is seated in a spring-loaded movable fashion and comprises a locking hook arranged to automatically engage, under the action of the spring, recesses provided in a link guide that serve as locked positions. This ensures automatic arresting of the cover both in the closed and in an open position.

According to a further embodiment of the invention, the retaining element can move linearly and in parallel to the plane of the cover in a guide on the cover, while the link guide is fixed immovably on the housing. This provides favorable conditions for the engagement of the retaining element in the link guide.

In a further embodiment of the invention, the retaining element comprises an actuating member that is accessible through a recess in the cover and by means of which the retaining element can be moved out of a locked position against the action of a spring. This allows manual unlocking to be achieved in a simple way.

According to a further embodiment of the invention, the retaining element is guided in parallel to the pivot axis of the cover. This permits the cover to be simultaneously unlocked and pivoted in an ergonomically favorable fashion.

In a further embodiment of the invention, a circumferential elastic seal is

provided between the cover and the housing, which is compressed by the closed cover when the retaining element is arrested in its first locked position. This arrangement allows the flush-mounted electrical installation unit to be closed off water-tight, making it thus suitable for floors that must be cleaned with water. The elasticity of the seal is utilized in this case to assist the opening movement of the cover.

According to a still further embodiment of the invention, at least one opening spring is provided which is compressed when the cover is closed. This has the effect that the opening movement of the cover is assisted by the action of the opening spring, the spring excursion and the spring constant being freely selectable, within large limits.

Further advantages and features of the invention are apparent from the sub-claims and the following description of one embodiment of the invention, given with reference to the drawings, in which:

- Fig. 1 shows a sectional view of one embodiment of a flush-mounted electrical installation unit according to the invention, with a cover mounted pivotably on a frame, the cover being shown in its closed position;
- Fig. 2 shows a sectional view of a frame with associated cover, similar to that of Fig. 1, the frame exhibiting an additional carpet-protecting flange and the cover being shown in an open position in which it serves as a cord outlet;
- Fig. 3 shows a function diagram illustrating different positions of a latch that serves as a retaining element, viewed from side III in Fig. 1;
- Fig. 4 shows an exploded view of the latch with an associated mounting member and the cover of the flush-mounted electrical installation unit, viewed from top IV in Fig. 1; and

Fig. 5 shows a sectional view of a detail of a frame with the associated cover, similar to Fig. 1, with an opening spring provided between the cover and the frame to assist the opening movement of the cover.

In Fig. 1 a flush-mounted electrical installation unit 1 can be seen that can be inserted into a recess in a floor in such a way that the upper edge of a frame 2, that can be adjusted in height within the flush-mounted electrical installation unit 1, extends flush with the floor surface. The cross-sectional shape of the flush-mounted electrical installation unit, including its frame, is preferably circular, although any cornered configuration may also be used. An installation cup 18 of the flush-mounted electrical installation unit accommodates a plurality of electrical installation components, not illustrated in detail in the drawings. Mounting of the flush-mounted electrical installation unit in the floor is effected in the conventional way so that these operations need not be described here in more detail.

The upper opening of the frame 2 can be closed by a cover 3 arranged to swing on the frame 2 about an axis 14 that extends horizontally in the mounted condition. In the illustration of Fig. 1, the cover 3 is shown in its closed position in which it extends flush with both the frame 2 and the floor, in the mounted condition, while on the other hand its inner sealing surface 3a simultaneously compresses a circumferential seal 15 against frame 2. One thus obtains a water-tight arrangement particularly suitable for floors that must be cleaned with water, as has been known before from EP 0 648 000 B1.

The representation of Fig. 2 is limited to a slightly modified embodiment of a frame 2 according to the invention which differs from the frame 2 according to Fig. 1 in that it comprises a carpet-protecting frame 2a that sits on the floor in the mounted condition.

On the side opposite the pivot axis 14, locking means 4 to 11 are provided by means of which the cover can be positively arrested in both its closed position, illustrated in Fig. 1, and its open position, illustrated in Fig. 2. The locking means are provided for this purpose with a latch 4, seated on the cover and made preferably from rigid sheet steel, that serves as a retaining element for the cover. On its upper face, the latch 4 is provided with a guide section 19, and on its lower face with a locking hook 6.

The guide section 19 is seated, for linear displacement in parallel to the plane of the cover, in a receiving pocket 3b in the cover 3. A biased spring 10, likewise arranged in the receiving pocket 3b, urges the guide section 19, with the required spring pressure, unilaterally in the direction indicated by arrow 16. The top view of Fig. 4 illustrates the manner in which the guide section 19 is to be biased via the spring 10 against the mounting member and to be fitted in the receiving pocket 3b of the cover 3 in the direction indicated by arrow 20. To this effect, two operating lugs 17, provided on the guide section 19, are fitted in a recess 3c in the upper face of the cover 3 in a manner such that the latch 4 can be actuated from above. During assembly, the mounting member 13 is locked in the cover, in a manner not shown in detail, whereby the arrangement described before is secured against detachment. The load exerted by the spring on the guide section 19 in the direction indicated by arrow 16 urges the latch 4 into an outer rest position, relative to the cover, in which the spring is unloaded to the maximum extent possible. In Fig. 3, the latch 4 assumes that rest position relative to the cover in the positions 4'' and 4''', in which the latch is in its extreme right-hand positions.

When the cover occupies a position between the positions illustrated in Figs. 1 and 2, the locking hook 6 of the latch 4 engages the link guide 7, 8, 11 of its mating component 5, being then positively guided therein. The locking hook is preferably configured as a sheet-steel extension of the latch 4 that extends obliquely to the direction of movement of the latch and vertically outward from the latter. Fig. 3 shows the arrangement and

configuration of the locking hook 6 on the latch 4 and, in dash-dotted lines, different positions 4' to 4'''' of the latch, including the locking hook, relative to its mating component 5, with the latter comprising the link guide.

The link guide 7, 8, 11 is part of the mating component 5, which latter is fixed on the frame 2, is preferably made from a plastic material and exhibits the general shape of a C in the illustration of Fig. 3. It comprises a lower recess 8, serving as a first locking position for the locking hook 6, and an upper recess 7, serving as a second locking position, with a vertically extending section 11 connecting the two recesses. The upper recess terminates toward the top by an introduction section 9 exhibiting a beveled ramp surface 9a. The beveled ramp surface 9a is complementary to the obliquely oriented locking hook 6, as can be seen in Fig. 3.

Fig. 3, where the cover occupies its fully swung-out position, illustrates the operation of the locking mechanism according to the invention. During inward movement of the cover 3, toward its closed position, the lower end of the latch 4, carrying the locking hook 6, initially engages the introduction section 9 of the link guide. In this position 4', the locking hook 6 abuts against the beveled ramp surface of the introduction section with the result that when the cover continues its closing movement, the latch 4 will be moved out of its rest position against the direction indicated by arrow 16 and, thus, against the action of the spring 10. Once the locking hook has passed the introduction section 9 in vertical direction, whereby the latch 4 simultaneously has been displaced in crosswise direction, it is urged by the spring into the upper recess 7 so as to occupy the position 4''. In this position, the latch 4 again occupies its outer rest position, relative to the cover, being now positively locked in the link guide and, thus, fixed on the mating component 5. This position 4'' of the latch 4 corresponds to the position of the cover and the latch illustrated in Fig. 2. The space between the cover 3 and the frame 2 is now available as passage for electric connection lines, with the cover being reliably held in

this position.

The locked condition can be released exclusively by moving the latch 4 out of its outer rest position against the force of spring 10 in opposite direction to arrow 16, specifically by means of the operating lugs 7, whereby the locking hook 6 moves into the central guide section of the link guide (position 4''') or back to position 4' so that pivoting of the cover is again rendered possible.

If the closing movement of the cover 3 is continued, with the connection lines removed, the locking hook continues to slide through the link guide, starting out from position 4'', and comes to engage the lower recess 8 under the action of the tensioned spring 10 as soon as the cover reaches its closed position. In this position 4''', which corresponds to that shown in Fig. 1, the latch 4 is again positively locked in the link guide of the mating component 5, with the effect that the cover is locked in that position. Releasing the cover from its locked condition is then again possible if the latch 4 is moved against the action of the spring 10 until it enters the central section 11 of the link guide so that the cover 3 is again free to swing.

Fig. 5 shows another modified embodiment of the frame 2 as shown in Fig. 1. This embodiment comprises an additional opening spring 21 between the cover and the frame, which - as can be seen in Fig. 5 - is fitted in a receiving pocket 22 of the frame near the pivot axis 14 and is subjected to bending stress when the cover is closed. As long as the latch remains locked in its position 4''', and the cover remains locked in its closed position, the opening spring 21 remains tensioned. Once the locked condition and the swinging movement of the cover are released, the latter can be swung open solely under the action of the opening spring by an angle that depends on the spring excursion and the spring constant of the opening spring whereby the latch 4 is moved into its position 4''. This effectively assists the opening action of the cover.



Claims:

1. A flush-mounted electrical installation unit comprising a cover, seated in swing-out fashion on a housing, and locking means comprising a lockable retaining element for locking the cover in its closed position, wherein at least two locked positions (7, 8) are provided for said retaining element (4) in such a way that when said retaining element is locked in its first locked position (8) said cover (3) occupies its closed position, and when said retaining element is locked in its second locked position (7) said cover occupies its open position in which it serves as a cord outlet.
2. The flush-mounted electrical installation unit of Claim 1, wherein said retaining element (4) is seated in a spring-loaded movable fashion and comprises a locking hook (6) arranged to automatically engage, under the action of the spring, recesses (7, 8) provided in a link guide that serve as locked positions.
3. The flush-mounted electrical installation unit of Claim 2, wherein said retaining element (4) can move linearly and in parallel to the plane of said cover in a guide (3b) on the cover, while the link guide (7, 8, 11) is fixed immovably on said frame.
4. The flush-mounted electrical installation unit of Claim 3, wherein said retaining element (4) comprises an actuating member (17) that is accessible through a recess (3c) in the cover and by means of which said retaining element can be moved out of a locked position against the action of a spring.
5. The flush-mounted electrical installation unit of Claim 3, wherein said retaining element (4) is guided in parallel to the pivot axis of said cover (3).

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6. The flush-mounted electrical installation according to at least one of Claims 1 to 5, wherein a circumferential elastic seal (15) is provided between said cover (3) and said frame (2), which is compressed by the closed cover when said retaining element (4) is arrested in its locked position (8).
7. The flush-mounted electrical installation according to at least one of Claims 1 to 6, wherein at least one opening spring (21) is provided between said cover (3) and said frame (2) which is compressed when the cover is closed.

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