

OPERATING DEVICE FOR AN OUTWARDS OPENING WING OF A DOOR OR A WINDOW

The invention relates to an operating device for an outwards opening leaf of a door or a window, comprising:

- a box inserted onto the lower rail of the sash-frame and serving
5 as a housing for a mechanism, actuated by a crank, to operate the rotation of an actuating arm provided, at its end, with a roller sliding in a guiding rail integral with the leaf;
- protection means to impede the access to the actuating arm, namely at the beginning and the end, respectively, of the opening and
10 closing of the leaf;
- and means for blocking same irrespective of its angular position relative to the sash-frame.

This invention will find its application in the building industry and will be used more particularly in the framework of a door or
15 window opening towards outside, so-called in the English way.

The devices allowing to operate the opening and the closing of the leaf of a door or window from the sash-frame are most frequently used in those countries in which the degree of humidity is particularly high during certain periods of the year, which favours the
20 development of flying insects. Because of these circumstances the autochthons are indeed obliged to line all the glazed surfaces with a mosquito net allowing to impede these flying insects from penetrating into their house. However, because of the outwards opening of the leaf, this mosquito net can only be arranged on the inner
25 side of the door or window. Such a mosquito net is generally formed by a curtain the weft of which is sufficiently aerated to favour the air circulation whilst impeding the flying insects from passing through. Furthermore, a frame inserted on the sash of the door or window allows to keep this curtain taut.

30 Since this mosquito net is useful only during part of the year, it is in most cases removable. However, in order to avoid the successive mountings and removals of these mosquito nets at each operation of the leaf, these doors or windows are provided with an operating device allowing to remotely actuate said leaf and, namely,
35 from the lower rail of the sash-frame. Furthermore, during those

periods in which the flying insects are particularly numerous, it is preferred not to proceed at any time to the removal of the mosquito nets, in order to impede any of these insects from penetrating into the house.

5 Namely from the documents US-A-4.392.330 and US-A-1.724.011 (this latter corresponding to the preamble of claim 1) is already known an operating device for an outwards opening leaf of a door or window comprising the above-mentioned components. Thus, this operating device comprises a fixed housing inserted onto the lower rail of
10 the sash-frame, said housing containing a mechanism allowing to rotatingly operate an actuating arm pivotingly mounted in the housing and connected to the leaf. Said mechanism is comprised of a worm or toothed wheel rotatingly driven by a crank and co-operating with the toothing made at the end of the actuating arm housed in the
15 box. Because of the arrangement on the lower rail of the sash-frame, the rotation axis of the worm of this operating device forms, in some cases, an angle of about thirty degrees with respect to the horizontal line to facilitate the actuation of the crank and for the window-sill not to form a hindrance for the rotation of
20 same.

This known type of operating device is generally associated with a group of folding arms arranged in the fillister of the sash-frame or the leaf allowing to confer to this latter not only a rotation about a vertical axis passing through its rear stile, but also a
25 translation parallel to the plane of the sash-frame of this rotation axis of the leaf. The interest of the combination of both these motions resides in sidely offsetting the rear stile of the leaf relative to the stile of the sash-frame to define a space allowing the access to the outer glazed surface.

30 This peculiarity finds its interest, namely, when the window is located at a certain height from the floor and it is therefore uneasily accessible to carry out the cleaning of the glazed surface.

Despite these interests, evoked above, of the known operating devices, same are however not without a number of disadvantages. When
35 the mosquito nets are removed from the sash-frame, the access to

the mechanism and, namely, to the actuating arm of this operating device is indeed particularly facilitated. Now, this substantially increases the risks of accident, for example, the catching of a finger, generally due to user's carelessness or negligence.

- 5 In order to cope with this disadvantage, an operating device has been designed substantially taking over the features of those described above, but the mechanism as well as the actuating arm of which are inserted into the fillisters of the sash-frame and the leaf. However, this type of operating device is generally of a
- 10 higher cost, namely due to the extra machining in said fillisters imposed by this arrangement of the various mechanical components. Another disadvantage which all these operating devices for an outwards opening leaf present resides in a weakness from the safety point of view in case of burglary. In the framework of a door or
- 15 window opening in the French way, these latter comprise, in some cases, fittings of the oscillating-swinging type providing the possibility of keeping the leaf in a half-open position whilst providing a minimum of safety against the movements of a swindler. In contrast, in the framework of outwards pivoting leaves, the mechanical link, connecting the operating device and said leaf when this
- 20 latter is in the half-open position, is comprised only of the actuating arm. Hence, and because of the important lever arm, the operating device can have only a low resistance and would rapidly be deteriorated in the case of movements onto the front stile of the
- 25 leaf. This disadvantage persists even in the case of using blocking means, such as described in the document US-A-1.724.011, intervening at the level of the rear end of the actuating arm to fix this latter in position and, as a consequence, the leaf in different angular positions relative to the sash-frame.
- 30 The solution for the problems raised above would reside in implanting the operating device as close as possible to the front stile of the leaf, thus reducing the lever arm. In these circumstances, the angle of rotation which it would be possible to confer to the leaf through this operating device would be highly limited and, in all
- 35 cases, smaller than ninety degrees.

The object of this invention is to cope with all the aforementioned troubles. Thus, the invention, as characterized in the claims, solves the problem residing in providing an operating device for an outwards opening leaf of a door or a window, comprising:

- 5 - a box inserted onto the lower rail of the sash-frame and serving as a housing for a mechanism, actuated by a crank, to operate the rotation of an actuating arm provided, at its end, with a roller sliding in a guiding rail integral with the leaf;
 - protection means to impede the access to the actuating arm, namely at the beginning and the end, respectively, of the opening and closing of the leaf;
 - and means for blocking same irrespective of its angular position relative to the sash-frame.
 - said protection means being formed by a profile having the shape of a sidely open gutter, comprising two horizontal wings connected by a vertical flank, said profile being applied onto the inner face of the lower rail of the sash-frame in closing position of the leaf, the upper wing completely overlapping the guiding rail to impede, in association with this latter, the access to said operating arm, namely at the beginning and the end, respectively, of the opening and closing of the leaf;
 - the means for blocking same in different angular positions being formed by locking means associated with the protection means and comprising a locking member, such as a drum or the like.
- 25 Other characteristics of the invention are defined by claims 2 through 9.

The advantages obtained thanks to this invention mainly reside in that the protection means avoid any risk of accident, such as the catching of a finger or the like, during the operation of the leaf.

- 30 Furthermore, the locking means allow to avoid repercussions onto the mechanism of the operating device of the efforts applied onto the front stile of the leaf. In addition, because of their proximity to said front stile of the leaf, these locking means substantially reduce the importance of the efforts it is possible to apply onto them, while allowing the rotation of the leaf on an angle
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equal to, or even larger than, ninety degrees.

The invention is explained more in detail below with reference to drawings showing only one embodiment.

Figure 1 is an exploded schematical, partial and perspective view,
5 according to the invention, of an operating device designed according to a first embodiment (the locking means not being shown).

Figure 2 is a schematical, elevation and cross-sectional view of an operating device as shown in Figure 1, inserted onto the lower rail of the sash-frame, according to a first embodiment.

10 Figure 3 is an view identical to Figure 2 and showing an operating device inserted onto the lower rail of the sash-frame, according to a second embodiment.

Figure 4 is a schematical plan and cross-sectional view of a door or window provided with an operating device according to the invention,
15 tion, designed according to a second embodiment (the locking means not being shown).

Figure 5 is a schematical plan and cross-sectional view of a door or window provided with an operating device as shown in Figure 1 and comprising locking means.

20 Reference is made to Figure 1.

The operating device 1, according to the invention, is used namely in the framework of an outwards opening door or window. Figure 1 schematically shows a window 2 the sash-frame 3 of which is provided, at the level of its lower rail 4, with such an operating device
25 1. The object of same consists in operating leaf 5 from inside the house without the user having to intervene directly onto said leaf 5.

The operating device 1 is comprised of a box 6 serving as a housing for a mechanism actuated by a crank (not shown) to operate the rotation of an actuating arm 7 connected to the leaf 5. The housing 6
30 is advantageously fixed, by insertion, onto the lower rail 4 of the sash-frame 3. This arrangement avoids the machining of the fillister of this lower rail 4 as well as the fillister of the lower rail 8 of the leaf 5. The mechanism of the operating device 1, which has
35 been referred to above, has not been shown in the various figures,

since it is perfectly known in the state of technique. However, it is convenient to specify that this mechanism is comprised of a worm capable of driving in rotation, either by means of a pinion or directly, the actuating arm 7, the direct driving of same being achieved thanks to a toothing machined at its end engaged into the housing 6. A crank (not shown) allows to operate said worm. For this purpose, the housing 6 comprises, in its cover 9, a boss 10 provided with an opening 11 through which ends an end of the worm, onto this end being inserted, by any fixing means whatsoever, the
10 aforementioned crank. In order to avoid that the window-sill may hinder the rotation of this crank during the operation of leaf 5, the rotation axis 12 (see Figures 1, 2 and 3) of the worm forms an angle of about thirty degrees relative to the horizontal line.

The connection between the leaf 5 and the actuating arm 7 is formed
15 by a roller 13 integral with the end 14 of same and sliding in a guiding rail 15 fixed by insertion onto the lower rail 8 of the leaf 5.

As can be seen in Figure 1, the operating device 1, and namely the housing 6, is fixed in the proximity of the rear stiles 16, 17 of
20 the sash-frame 3 and the leaf 5, respectively. Thanks to this arrangement, the operating device 1 is capable of conferring to said leaf 5 a rotation on an angle smaller than ninety degrees.

According to the invention, the operating device 1 comprises protection means 18 the function of which is to impede the access to
25 the actuating arm 7, namely at the beginning and at the end, respectively, of the opening and closing of the leaf 5.

Reference is made to Figures 1 through 3.

According to a first embodiment, these protection means 18 are formed by a profile 19, having the shape of a sidely open gutter,
30 comprised of two horizontal wings 20, 21 connected by a vertical flank 22. This profile 19 is inserted onto the inner face 23 of the lower rail 4 of the sash-frame 3, so that the vertical flank 22 be oriented in the direction opposite to the window 2. In addition, the upper wing 20 is located above the horizontal plane 24 passing
35 through the guiding rail 15. The upper wing 20 of this profile 19

advantageously has a width 25 larger than the width 26 of the lower wing 21 and is so determined as to receive the whole of said guiding rail 15 when leaf 5 is in closed position. Because of the peculiarity of the profile 19, the components of the mechanism, and
5 namely the actuating arm 7, are protected, in order to impede the user, or any other person, from having access to same during the critical moments of the operation of leaf 5. These critical moments are those at which the various moving parts are close to each other, namely at the beginning and the end, respectively, of the opening and closing of said leaf 5, which substantially increases the
10 risks of catching a finger or of deteriorating the operating device 1 due to an object surreptitiously introduced into the mechanism. Preferably, profile 19, forming the protection means 18, extends substantially over the full length of the lower rail 4 of the sash-
15 frame 3 and covers the housing 6. For this purpose, a cut 27 is provided for in the upper wing 20, in this cut 27 coming to be engaged the boss 10 located on the cover 9 of the housing 6.

This profile 19 can be fixed, by screwing-on, clipping-on or any other known fixing means, onto the sash-frame 3. Furthermore, the
20 ends 28, 29 of this profile 19 are obturated by side plates 30, 31 perpendicularly inserted onto the lower rail 4. These side plates 30, 31 advantageously comprise the above-mentioned means to fix the profile 19.

In Figure 2, the shape of the lower rail 4 of the sash-frame 3 allows to insert the operating device 1 directly onto the inner face
25 23. However, it may turn out that this shape of the lower rail 4 varies, namely at the level of the thickness 32 of the internal rim 33. Thus, in Figure 3, analogous to Figure 2, is shown a lower rail 4 the internal rim 33 of which has a particularly reduced thickness
30 34. In these circumstances, the insertion of the operating device 1 onto this lower rail 4 requires the use of a spacer 35 allowing to substantially widen the internal rim 33 and to bring it to the desired size.

Reference is made to Figure 4.

35 The protection means 18, in compliance with the embodiment des-

cribed above, are not capable of covering the actuating arm 7 during the complete rotation of leaf 5. To cope with this trouble and according to a second embodiment of the operating device 1, the upper wing 20 of profile 19 is comprised of two segments 36, 37, the segment 36, located between the front stile 44 of leaf 5 and boss 10, being removable and fixed, above the guiding rail 15, onto the lower rail 8 of said leaf 5. Because of this arrangement, said segment 36 of the upper wing 20 is capable of covering the actuating arm 7 during the complete movement of leaf 5.

10 Reference is made to Figure 5.

According to the invention, the operating device 1 also comprises locking means 38 to block leaf 5, irrespective of the position of same. Because of this peculiarity of the operating device 1, an effort applied onto leaf 5 is repercutated onto the locking means 38 and not onto the mechanism located inside the housing 6.

Preferably, these locking means 38 are comprised of an arm 39 one end 40 of which is connected by means of a hinged joint to leaf 5, the other end 41 of this arm 39 sliding in a locking device 42 integral with profile 19. Preferably, these locking means 38 are located in the proximity of the front stiles 43, 44 of the sash-frame 3 and the leaf 5, respectively.

According to the embodiment shown in Figure 5 the locking device 42 is inserted onto the upper wing 20 of profile 19 and is comprised of a pivoting base 45 provided with a box 46 serving as a housing for a locking member, such as a drum or the like, co-operating with the arm 39. It can also be envisaged to insert this locking device 42 into profile 19 and to insert the pivoting base 45 onto the inner face 47 of the upper wing 20. In these circumstances, it is necessary to machine a horizontal groove in the vertical flank 22 of said profile 19, this groove serving as a passageway for the rear end 41 of the arm 39 during the rotation of leaf 5.

However, this locking means 42 is not capable of being fixed onto the upper wing 20 when same is comprised of two segments 36, 37, the front segment 36 being removable and inserted onto leaf 5. In these circumstances, a spacer is arranged under the pivoting base

45 of this locking device 42, allowing the whole to rest on the lower wing 21 of profile 19. In addition, a space is provided for between the upper edge 48 of the vertical flank 22 and the segment 36 of the upper wing 20 serving as a passageway for the rear end 41 of the arm 39.



C L A I M S

1. Operating device for an outwards opening leaf (5) of a door or window, comprising:
- a box (6) inserted onto the lower rail (4) of the sash-frame (3) and serving as a housing for a mechanism, actuated by a crank, to operate the rotation of an actuating arm (7) provided, at its end (14), with a roller (13) sliding in a guiding rail (15) integral with the leaf (5);
 - protection means (18) to impede the access to the actuating arm (7), namely at the beginning and the end, respectively, of the opening and closing of the leaf (5);
 - and means for blocking same irrespective of its angular position relative to the sash-frame (3),
- operating device characterized in that:
- the protection means (18) are formed by a profile (19) having the shape of a sidely open gutter, comprising two horizontal wings (20, 21) connected by a vertical flank (22), said profile (19) being applied onto the inner face (23) of the lower rail (4) of the sash-frame (3), in closing position of the leaf (5), the upper wing (20) completely overlapping the guiding rail (15) to impede, in association with this latter, the access to said operating arm (7), namely at the beginning and the end, respectively, of the opening and closing of the leaf (5);
 - the means for blocking same in different angular positions are formed by locking means (38) associated with the protection means (18) and comprising a locking member, such as a drum or the like.
2. Operating device according to claim 1, characterized in that it comprises a spacer (35) interposed between the inner face (23) of the lower rail (4) of the sash-frame (3) and the profile (19), for the fixing of this latter onto said lower rail (4).
3. Operating device according to claim 1, characterized in that the profile (19) extends over the full length of the lower rail (4) of the sash-frame (3) and covers the housing (6), the upper wing (20) of said profile (19) comprising a cut (27) into which is engaged a boss (10) located on the cover (9) of said housing (6).

4. Operating device according to claims 1 through 3, characterized in that the upper wing (20) of profile (19) is comprised of two segments (36, 37), the segment (36), located between boss (10) and the front stile (44) of leaf (5), being removable and fixed onto the lower rail (8) of said leaf (5), above the guiding rail (15).
5. Operating device according to claim 1, characterized in that the locking means (38) are comprised of an arm (39) one end (40) of which is connected by means of a hinged joint to leaf (5), the other end (41) of this arm (39) sliding in a locking device (42) integral with profile (19), these locking means (38) being fixed in the proximity of the front stiles (43, 44) of the sash-frame (3) and the leaf (5), respectively.
6. Operating device according to claim 5, characterized in that the locking device (42) comprises a pivoting base (45) provided with a box (46) serving as a housing for the locking member, such as a drum or the like, co-operating with the arm (39).
7. Operating device according to claim 6, characterized in that the locking device (42), and namely the pivoting base (45), is fixed onto the upper wing (20) of profile (19).
8. Operating device according to claim 6, characterized in that the locking device (42) is housed in profile (19), the pivoting base (45) being fixed onto the inner face (47) of the upper wing (20) and the vertical flank (22) comprising a horizontal groove serving as a passageway for the rear end (41) of the arm (39).
- Operating device according to claims 4 through 6, characterized in that the locking device (42) is housed in profile (19) and rests, by means of a spacer, onto the lower wing (21), a space provided for between the upper edge (48) of the vertical flank (22) and the segment (36) of the upper wing (20) serving as a passageway for the rear end (41) of the arm (39).

