

Title: MOUNTING ARRANGEMENT FOR A DOOR ACTUATOR

Description

5

The present invention relates to a mounting arrangement for a door operator including a mounting plate for mounting the door operator to a reception member such as a door leaf, a door transom, a wall, a ceiling or the like, wherein the door operator is attachable to the mounting plate, and wherein the mounting plate has latching means and the door operator has counter-latching means associated to the latching means, wherein the latching means are disposed for retaining the door operator in an arranged manner at the mounting plate and are latchable in the counter-latching means in that the door operator is moved in a latching direction on the mounting plate. The present invention relates furthermore to a mounting method for mounting the door operator to the reception member.

20 Door operators may be mounted to a reception member in that most of the time screws are used, which can pass through the door operator, and are then screwed into the reception member. If a mounting plate is used, the latter can be initially mounted to the reception member in that for example several
25 screws are used, most of the time wood screws or anchor screws. Once the mounting plate is mounted to the reception member, the door operator is subsequently placed and

attached in turn by screws to the mounting plate, which screws pass through the door operator and are screwed into the mounting plate. In this case it is disadvantageous, that, after mounting the door operator, the screw connection is visible on the mounting plate and on the upper side of the door operator.
5 As a consequence, cover caps are often used, which cover the reception holes for receiving the screws in the door operator.

A mounting arrangement for a door operator for operating a door is known for example from the document DE 20 2007 005 10 265 U1, wherein the door operator can be screwed to a mounting plate. For this purpose, the mounting plate is initially attached to a reception member, such as a door leaf, a door transom, a wall, a ceiling or the like, such as to subsequently
15 screw the door operator to the mounting plate. The mounting plate has threaded bores into which screws can be screwed. The door operator has a housing, wherein the screws pass through the holes in the housing prior to being screwed into the threaded bores of the mounting plate. The result is a screw
20 connection of the door operator to the mounting plate, which is visible for a user from the outside. In order to cover the screw connections, door operators have covers, which, once mounting the door operator is completed, are placed onto the housing. The result is a complicated arrangement of a cover, wherein,
25 without utilizing a cover, the screw connection, which is realized from an orthogonal direction towards the mounting plate, remains visible for a viewer. Furthermore, tools are required in

order to carry out the screw connection for attaching the door operator to the mounting plate.

5 The document DE 78 25 463 U1 shows another arrangement for mounting a door operator to a mounting plate, wherein retaining grooves with complementarily configured opposite projections are provided between the door operator and the mounting plate. Thus, the principle of a groove guidance is realized, and the door operator needs to be pushed onto the
10 mounting plate from the side. Subsequently, a spreader member, in the shape of a threaded pin, is tightened and a pressing action is achieved between the retaining groove and the projection. As a consequence, the door operator is clamped to the mounting plate in the inserting direction, wherein a form
15 closure geometry is realized by means of the groove guidance. However, a required machining of the retaining groove and of the projection is disadvantageous. Furthermore, again a tool is required in order to manipulate the visible threaded pin.

20 Therefore, it is the object of the present invention to provide a mounting arrangement for a door operator, which overcomes the disadvantages of the aforementioned state-of-the-art and which allows for mounting the door operator to the reception member in an easier way. It is in particular the object of the
25 present invention to provide a mounting of a door operator to a reception member free from play and to execute said mounting

in a way to be able to transfer high actuating forces of the door operator.

5 This problem is solved based on a mounting arrangement for a door operator according to the generic part of claim 1 in conjunction with the characterizing features. Advantageous further developments of the invention are indicated in the dependent claims.

10 The invention includes the technical teaching that at least one screw element is provided between the door operator and the mounting plate, by means of which the door operator is movable on the mounting plate in latching direction and by means of which the latching means can be brought into a
15 latched position in the counter-latching means and/or can be retained in the latched position.

In this case, the invention is based on the idea that the screw element may be utilized to move the door operator over the
20 mounting plate in the latching direction until the latching means latches in the counter-latching means. If the screw element is screwed tight with an appropriate tightening torque, a force can be overcome which might be required to move the latching means into the final latched position in the counter-latching
25 means. Obviously, there is also the possibility to move the door operator, once it has been placed onto the mounting plate, manually in the latching direction and to activate the screw

element only when the latching means need to be pressed into the final latched position in the counter-latching means.

5 The inventive arrangement of a screw element between the door operator and the mounting plate achieves the advantage of being able to engage the latching means in the counter-latching means with a force which is greater than a force which usually can be applied during manual displacement of the door operator in the latching direction over the mounting plate.

10

It is particularly advantageous, if the mounting plate may include four latching means and the door operator may include four counter-latching means associated to the latching means. The latching means and the counter-latching means may be
15 configured in this case in that, during a movement of the door operator in the latching direction, the four latching means simultaneously latch in the counter-latching means. The latching means may be disposed in pairs opposite each other and/or in pairs disposed next to each other at the mounting
20 plate, in particular the latching means provided in pairs may be disposed spaced apart from each other at the mounting plate in that the distance of the latching means corresponds to the principal dimensions of the mounting plate. The mounting plate may have an elongate extension which corresponds to the
25 elongate extension of the door operator. The principal dimensions of the mounting plate thus form a rectangle and the latching means are disposed in the corners of the rectangle.

The advantage is thereby achieved of being able to transfer particularly high forces between the door operator and the mounting plate, and it is of particular advantage, if the mounting plate has preferably an extension as elongate as possible such
5 that the latching means, which are disposed in pairs opposite each other, have the largest possible distance to each other. When operating the door operator, high forces may be applied to the latter, which, via the mounting plate, are guided into the reception member. The load situation resulting for the mounting
10 plate may be considered to be advantageous, if the latching means, via which the forces coming from the counter-latching means of the door operator are introduced into the mounting plate, have the largest possible distance to each other.

15 Advantageously, the latching means may be configured to be spring-resilient and they may have an inclination in order to provide an elastic bracing of the latching means in the counter-latching means, once the door operator reaches the latched position at the mounting plate. Until the latching means reach
20 the latched position in the counter-latching means, the latching means are spring-resiliently deformed and the door operator is braced against the reception member, onto which the door operator is placed. The latching means may be configured at the mounting plate as wing-shaped latching conformations such
25 that the latching means and the mounting plate may be manufactured from a single-piece sheet metal part. The execution as a sheet metal part results in an elastic resiliency of

the latching means and they may be spring-resiliently bent until they reach the latched position in the counter-latching means. In particular in order to develop the force for engaging the latching means in the counter-latching means while elastically
5 deforming the latching means, the screw element may be activated, and the door operator does not have to be manually moved into the final latched position on the mounting plate what circumstance might require high forces. On account of the screw element, which can be activated by means of a screw
10 driver, in particular a hexagon key, a correspondingly high force can be applied to the door operator in order to pull or to push the latter over the mounting plate into the latched position. Thus the inventive utilization of a screw element between the door operator and the mounting plate results in another advantage of
15 being able to brace the latching means in the counter-latching means with a bracing force which could not have been deployed by manually engaging the latching means in the counter-latching means. The screw element, between the door operator and the mounting plate, is disposed to be invisible,
20 such that the screw element may be subject to a pull on account of a bore or a cut-out located in the door operator, in that the screw element is supported at the door operator and is screwed into the mounting plate, or the screw element is subject to compression in that it is securely accommodated in
25 the door operator in longitudinal direction and is able to press against the mounting plate. Thereby, via the screw element, a force can be exerted between the door operator and the

mounting plate, in order to correspondingly displace the door operator in relation to the mounting plate.

5 In order to achieve a bracing action of the latching means in the counter-latching means once the latched position is reached, in addition to or as an alternative to the latching means having an inclination, it may be provided that the counter-latching means in the door operator have an inclination, such that the latching means are elastically braced in the counter-latching means, 10 once the door operator reaches the latched position at the mounting plate. In particular, both the latching means and the counter-latching means may each have an inclination that correspond to each other and the further the latching means reach the final latched position in the counter-latching means, 15 the stronger becomes the elastic bracing of the latching means in the counter-latching means. In this case, the inclination has an angle with regard to the plane of extension of the mounting plate, and once the latching means engage in the counter-latching means, the latching means at the mounting plate are 20 elastically bent further out of the plane of extension of the mounting plate.

Advantageously, the door operator has a housing with a reception area on the underside, in which the mounting plate 25 can be accommodated, wherein the housing laterally surrounds the mounting plate, once the door operator is disposed at the mounting plate. The housing may have a support area by

means of which the housing rests on the reception member, such as the door leaf, the door transom, the wall, the ceiling or the like, once the door operator is located in the latched position at the mounting plate. As a consequence, the mounting plate
5 may constitute a bracing element between the door operator and the reception member. The mounting plate may be screwed to the reception member by means of several screws, and the latching means are disposed at the mounting plate in a pre-formed manner in such a way that they are disposed
10 spaced apart from the surface of the reception member. If the door operator is then disposed at the mounting plate, and the latching means are engaging in the counter-latching means in the latched position, the latching means bend spring-resiliently over the inclination, which the latching means, and in particular
15 the counter-latching means, include. In the installed condition of the door operator, the mounting plate is therefore impinged by a force which pulls the mounting plate away from the reception member in an orthogonal direction. The door operator, via its support area, is simultaneously pressed onto the support such
20 that, as a result, a highly loadable arrangement of the door operator on the reception member is made possible.

According to an advantageous further development of the inventive mounting arrangement, the housing may have guiding
25 means which cooperate with counter-guiding means of the mounting plate for guiding the door operator over the mounting plate in the guiding direction. In the reception area of the

housing of the door operator, the guiding means may constitute two bolt-like domes for example, which are disposed to be spaced apart from each other, and which are guided in the counter-guiding means in the mounting plate, wherein the counter-guiding means are configured for example as a guiding gate. A precise arrangement of the housing of the door operator above the mounting plate is thereby realized, in particular a precise guiding of the latching means in the counter-latching means is achieved.

10

The housing may have at least one screw reception against which the screw element is supportable and/or into which the screw element is screwable. The screw element may be executed for example with a screw head which is stationarily accommodated in the screw reception, yet remains rotatable. In this case, the screw shaft may be screwed into a threaded bore in the mounting plate, and, if the screw element is entrained into a rotational movement, the distance of the mounting plate to the screw reception changes. In particular the mounting plate may have at least one screw connection into which the screw element is screwable and/or against which the screw element is supportable. The screw connection may be configured by the threaded bore in the mounting plate, whereas the screw reception accommodates the head of the screw element. If the screw reception in the housing of the door operator is configured as a threaded bore, into which the screw element is screwable, the screw element, with the end of the screw shaft,

25

may press against a pressure area, which constitutes the screw connection. In the last case, the screw element is subject to pressure, if the door operator is moved in the latching direction over the mounting plate.

5

As a further development, a connecting element may be provided between the screw element and the mounting plate, into which connecting element the screw element is screwable and which connecting element can be in particular positively disposed at the mounting plate. For example a threaded bore, into which the screw element is screwable, may be provided in the connecting element. At the same time, the connecting element is disposed to be positively retained at the mounting plate, and when the screw element is screwed into the threaded bore in the connecting element, a pulling force can be exerted onto the mounting plate.

Advantageously, the housing of the door operator has at least one opening or cut-out, through which a tool can pass in order to entrain the screw element into a rotational movement. The opening may be configured as a small hole or a small recess in the housing and be dimensioned in such a way that an assembly tool for screws, for example a hexagon key or a screw driver can pass through the opening. As a consequence, the opening is disposed at the housing in a way to be aligned with the central axis of the screw element.

It is furthermore advantageous, if the mounting plate has a snap-in element, which can be brought into a latching arrangement at the housing of the door operator, in particular if the door operator has been brought into the latched position on the mounting plate. The snap-in element and the mounting plate may be configured in one-piece and constitute a flexible tongue, which reaches a latching arrangement at the housing of the door operator, if the door operator has been brought into the latched position on the mounting plate. Therefore, the door operator is prevented from a self-acting release from the mounting plate, such that, even when loosening the screw element, which is located between the door operator and the mounting plate, releasing the door operator from the mounting plate is impossible, without firstly releasing the snap-in element from the latched arrangement at the housing.

The problem of the present invention is furthermore solved by a mounting method for mounting a door operator to a reception member such as a door leaf, a door transom, a wall, a ceiling or the like, by means of a mounting plate, wherein the mounting plate is attached to the reception member, and wherein the door operator is subsequently disposed on the mounting plate, and wherein the mounting plate has latching means and the door operator has counter-latching means associated to the latching means, and wherein the latching means are latched in the counter-latching means for a retaining arrangement of the door operator at the mounting plate, in that the door operator is

moved in a latching direction on the mounting plate. According to the invention, in this case, at least one screw element may be disposed between the door operator and the mounting plate, and the door operator is moved on the mounting plate by means of the screw element in the latching direction, and, by means of the screw element, the latching means are brought into a latched position in the counter-latching means and/or they are retained in the latched position. In this case, advantageously the screw element serves in particular to develop a force between the door operator and the mounting plate in the latching direction, in order to bring the latching means into the final latched position in the counter-latching means. In this case, this force may be greater than a manual force, by means of which the door operator can be moved in the latching direction on the mounting plate.

In particular prior to activating the screw element, the door operator may be placed onto the mounting plate and be manually moved in the latching direction, in order, for retaining the door operator in the arrangement disposed at the mounting plate, the latching means engage in the counter-latching means at least as far as in front of the final latched position, wherein, in particular after the manual movement of the door operator in the latching direction, the screw element is activated in order to engage the latching means in the final latched position in the counter-latching means. In particular the last partial portion of the movement of the door operator above the mounting plate in

the latching direction may be made possible by means of the screw element, in order to apply the appropriate force onto the door operator in the latching direction so that the latching means finally latch in the counter-latching means.

5

Further measures enhancing the invention will be illustrated in more detail in conjunction with preferred embodiments of the present invention. The following Figures illustrate in a diagrammatical way:

10

Figure 1a: an embodiment of a mounting arrangement of a door operator at a mounting plate in a perspective view,

15

Figure 1b: the embodiment of the mounting arrangement of the door operator at the mounting plate in a latched arrangement,

20

Figure 2a: another embodiment of a mounting arrangement of a door operator at a mounting plate in a perspective view,

25

Figure 2b: the embodiment of the mounting arrangement according to Figure 2a, wherein the door operator is located in a latched arrangement at the mounting plate,

- Figure 3a: another embodiment of a mounting arrangement of a door operator at a mounting plate in a non-latched view,
- 5 Figure 3b: the mounting arrangement according to Figure 3a, wherein the door operator has been manually moved in the latching direction above the mounting plate,
- 10 Figure 3c: the embodiment of the mounting arrangement of the door operator at the mounting plate according to Figures 3a and 3b, wherein the screw element has been activated to move the door operator into the final latched position,
- 15 Figure 4a: another embodiment of a mounting arrangement for a door operator at a mounting plate with a latching direction, which is oriented perpendicularly to the elongate extension of the door operator, and
- 20 Figure 4b: the mounting arrangement of the door operator at the mounting plate according to Figure 4a in a latched arrangement.

25

A first embodiment of a mounting arrangement for a door operator 10 with a mounting plate 11 for mounting the door

operator 10 to a reception member, which is not shown in detail, is illustrated in the Figures 1a and 1b. The mounting plate 11 may be attached to the reception member by means of screws 26 and the door operator 10 may be subsequently disposed on the mounting plate 11. For this purpose, the door operator 10 is placed onto the mounting plate 11 such that the mounting plate 11 is accommodated in a reception area 17 of the housing 16 of the door operator 10. The reception area 17 constitutes a hollow space in the housing 16 and when the door operator 10 with the housing 16 is placed onto the mounting plate 11, the mounting plate 11 is located in the reception area 17, and the housing 16 of the door operator 10 with its support area 18, which surrounds the reception area 17, may rest on the reception member.

15

The mounting plate 11 has latching means 12, which, as wing-shaped conformations, are configured laterally at the mounting plate 11. Counter-latching means 13, which are configured in the shape of recesses and into which the latching means 12 can engage, are provided inside the housing 16. Engaging the latching means 12 in the counter-latching means 13 is realized by a movement of the door operator 10 in a latching direction 14. This movement may be executed at least partially in a manual manner, wherein according to the invention, a screw element 15 is shown, which is accommodated in a screw reception 21 at the housing 16 of the door operator 10. The screw element 15 is connected to the mounting plate 11 via a

screw connection 22, wherein the screw connection 22 is configured by a link-plate, which is bent-over in the material of the mounting plate 11 and a threaded bore is provided therein. The screw element 15 is screwed into the threaded bore of the screw connection 22 and the screw reception 21 constitutes a support against which the head of the screw element 15 comes to bear. If the screw element 15 is activated, in that the latter is entrained into a rotational movement by means of a tool passing through an opening 24, the shaft of the screw element 15 is screwed into the screw connection 22. By means of the screwing movement of the screw element 15 into the screw connection 22, the door operator 10 is moved along the latching direction 14 over the mounting plate 11 such that the latching means 12 are able to latch in the counter-latching means 13.

Four latching means 12 are affixed at the mounting plate 11 in a disposition as pairs, and four counter-latching means 13, which are associated to the respective latching means 12, are fitted into the housing 16 of the door operator 10. The four latching means 12 form a rectangle which almost corresponds to the principal dimensions of the mounting plate 11. The screws 26 for screwing the mounting plate 11 to the reception member are disposed to be adjacent to the wing-shaped conformed latching means 12, in order to guarantee an optimum introduction of forces from the housing 16 of the door operator 10 via the mounting plate 11 into the reception member, without having any major disruption in the flow of forces.

The mounting plate 11 has been manufactured from a sheet metal part in stamping-bending procedures, and the latching means 12 are configured as elastic, wing-shaped conformations in one-piece with the mounting plate 11 and are conformed to the body of the mounting plate 11. Furthermore, the screw connection 22 is configured as a bent link-plate, which extends almost at a right angle from the plane of extension of the body of the mounting plate 11 and has a threaded bore fitted therein. In the centre, the mounting plate 11 has a geometrical reinforcement 27, which is configured in the shape of a camber stamped into the mounting plate 11 and extends in the longitudinal direction of the mounting plate 11.

The counter-latching means 13 form guiding grooves, which are fitted into the inside of the housing 16 of the door operator 10 and point into the reception area 17. The grooves have an inclination with regard to the flat support area 18 on the underside of the housing 16 and, if the wing-shaped latching means 12 are being engaged into the groove-shaped counter-latching means 13, the latching means 12 experience an elastic deformation and, via the support area 18, the housing 16 of the door operator 10 is simultaneously pressed against the reception member. As a consequence, a highly load-bearing arrangement of the door operator 10 on the surface of the reception member is created, and, via the housing 16, the actuating forces, which are generated when operating the door

operator 10, can be transferred into the reception member, for example the door leaf or the door transom.

The Figures 2a and 2b show another embodiment of a door
operator 10 including a housing 16 and a reception area 17 into
5 which a mounting plate 11 is fitted. The illustrated embodiment
comprises two screw elements 15, which extend between the
door operator 10 and the mounting plate 11. On the inside in
the reception area 17, the door operator 10 includes two screw
10 receptions 21, and one screw element 15 is accommodated in
each of the screw receptions 21. The mounting plate 11 has
two screw connections 22 in the shape of a link-plate, which is
bent-over in the material of the mounting plate 11, into which
15 respectively one threaded bore is fitted and into which the
screw elements 15 are screwed. Correspondingly to the
number of screw elements 15, the housing 16 of the door
operator 10 has two openings 24 through which a tool can
pass, in order to entrain the screw elements 15 into a rotational
movement. By activating the screw elements 15, the door
20 operator 10 can be moved in the latching direction 14 above the
mounting plate 11, such that the latching means 12 can latch in
the counter-latching means 13. In this case, the installation
situation of the door operator 10 on the mounting plate 11 is
illustrated in Figure 2a without the latching means 12 being
25 latched in the counter-latching means 13. Figure 2b shows the
installation situation of the door operator 10 above the mounting
plate 11, and the door operator 10 has been moved in the

latching direction 14, such that the latching means 12 are latched in the counter-latching means 13.

Guiding means 19 in the shape of guiding domes are disposed
5 at the housing 16 of the door operator 10, and the guiding
means 19 are guided in counter-guiding means 20 which, as
guiding gates, are fitted in the mounting plate 11. Guiding the
housing 16 of the door operator 10 in the centre above the
mounting plate 11 is thereby achieved such that the latching
10 means 12 can be uniformly engaged in the counter-latching
means 13. In a direction opposite the latching direction 14, the
counter-guiding means 20 may have a tapering such that, when
the latching means 12 are disposed in the counter-latching
means 13 in the latched position, a particularly precise
15 alignment of the door operator 10 is achieved above the
mounting plate 11. In this case, the width of the guiding gate
may correspond to almost the diameter of the guiding dome.

Furthermore, the mounting plate 11 is shown with a snap-in
20 element 25 which is then able to latch in a latching means in the
housing 16 once the door operator 10 has reached the final
latched position on the mounting plate 11. The snap-in element
25 is configured as a flexible tongue and may be bent out of the
plane of extension of the mounting plate 11 such that the snap-
25 in element 25, on account of the pre-tension thus applied to it,
may reach a latching abutment at the latching means.

Figures 3a, 3b and 3c show another embodiment of a mounting arrangement for a door operator 10 at a mounting plate 11. A screw element 15 is shown between the door operator 10 and the mounting plate 11, and a screw reception 21, in which the screw element 15 is retained, is shown at the housing 16 of the door operator 10.

A connecting element 23, which has a threaded bore and into which the screw element 15 is screwed, is shown for connecting the screw element 15 to the mounting plate 11. The mounting plate 11 has two link-plate-shaped bent-over areas, in which the connecting element 23 is positively accommodated. If a pulling force is applied via the screw element 15 onto the connecting element 23, the latter may act as a catch in order to move the mounting plate 11 by means of the link-plate-shaped bent-over area in the latching direction 14.

Figure 3a shows a mounting arrangement of the door operator 10 on the mounting plate 11, with the latching means 12 not being latched in the counter-latching means 13. Figure 3b shows the arrangement of the door operator 10 on the mounting plate 11, and the door operator 10 has been moved manually in the latching direction 14 over the mounting plate 11, such that the latching means 12 are already at least partially latched in the counter-latching means 13. Figure 3c shows the arrangement with an activated screw element 15, i.e. being already screwed-in, by means of which the door operator 10 is

retained on the mounting plate 11 in the final latched position. In this case, the link-plate-shaped bent-over areas constitute the screw connection 22, without a threaded bore being fitted into the material of the mounting plate 11, and they serve for
5 the supported mounting of the connecting element 23.

The Figures 4a and 4b show another embodiment of the mounting arrangement for a door operator 10 on a mounting plate 11. Initially the mounting plate 11 is screwed onto a
10 reception member by means of screws 26, and then the door operator 10 can be placed onto the mounting plate 11. Subsequently, the door operator 10 can be moved in a latching direction 14, in order to latch the latching means 12 of the mounting plate 11 in the counter-latching means 13 in the
15 housing 16 of the door operator 10. In this case, the latching direction 14 extends vertically to the elongate extension of the door operator 10, and the door operator 10 may be used for example in a mounting situation which does not allow for a movement of the door operator 10 above the mounting plate 11
20 in the longitudinal direction of the door operator 10, for example on account of an adjoining wall. The movement of the door operator 10 over the mounting plate 11 may be realized either manually or in particular via a screw element 15, which can be activated by means of a tool passing through an opening 24 in
25 the housing 16 of the door operator 10. In this case, Figure 4a shows the mounting arrangement of the door operator 10 on the mounting plate 11 prior to a movement of the door operator

10 over the mounting plate 11 in the latching direction 14, and
Figure 4b shows the mounting arrangement in a latched
mounting situation, in which the latching means 12 of the
mounting plate 11 are latched in the counter-latching means 13
5 of the housing 16 of the door operator 10.

A snap-in element 25 in the shape of a flexible tongue, which is
fitted into the mounting plate 11 and able to latch in a latching
means in the housing 16 of the door operator 10, is furthermore
10 shown. On account of the snap-in element 25 latching in the
housing 16, the final latched position of the door operator 10 on
the mounting plate 11 is already secured, wherein the screw
element 15 serves again as the means for applying the force to
move the door operator 10 in the latching direction 14 on the
15 mounting plate 11. Moreover, the advantage is achieved that
the screw element 15 serves as an additional connecting
means between the door operator 10 and the mounting plate
11, once the door operator 10 has reached the final latched
position on the mounting plate 11.

20

It is likewise conceivable to equip the door operator 10 with an
additional component, which includes the counter-latching
means 13. It is thereby possible to eliminate the machining
operation for the counter-latching means 13 at the housing of
25 the door operator 10. The additional component, which includes
the counter-latching means 13, may be for example a stamped
and bent part, wherein said additional component may be

disposed at the door operator 10 by means of traditional connecting means such as a screw connection or a glued connection for example.

5 The invention in its configuration is not limited to the above presented preferred embodiments. On the contrary, a number of variants is conceivable, which make use of the illustrated solution, even with basically different types of embodiments. All features and/or advantages including the constructional details,
10 spatial dispositions resulting from the claims, the description or the drawings, may be essential to the invention, both by themselves and in the most various combinations. In particular in the execution of the mounting arrangement of the door operator 10 on the mounting plate 11 according to the Figures
15 4a and 4b, even two or more screw elements 15 may be utilized between the door operator 10 and the mounting plate 11. Furthermore, several snap-in elements 25 may be fitted into the mounting plate 11, and an enhanced safety may be achieved to prevent the door operator 10 from being uninstalled without
20 authorization, in that all the snap-in elements 25 need to be brought into a bent-back position at the same time by means of a lever tool, in order to be able to release the snap-in element 25 from the latched arrangement in the housing 16 of the door operator 10 and in order to be able to release the door operator
25 10 again from the mounting plate 11 in a direction opposite to the latching direction 14.

List of reference numerals

	10	door operator
	11	mounting plate
5	12	latching means
	13	counter-latching means
	14	latching direction
	15	screw element
	16	housing
10	17	reception area
	18	support area
	19	guiding means
	20	counter-guiding means
	21	screw reception
15	22	screw connection
	23	connecting element
	24	opening
	25	snap-in element
	26	screw
20	27	reinforcement

Patent claims

1. A mounting arrangement for a door operator (10) with
a mounting plate (11) for mounting the door operator
(10) to a reception member, such as a door leaf, a
door transom, a wall, a ceiling or the like, wherein the
door operator (10) can be fastened to the mounting
plate (11), and wherein the mounting plate (11)
includes latching means (12) and the door operator
(10) includes counter-latching means (13) associated
to the latching means (12), and the latching means
(12) are latchable in the counter-latching means (13)
for a retained arrangement of the door operator (10) at
the mounting plate (11), in that the door operator (10)
is moved on the mounting plate (11) in a latching
direction (14), **characterized in that** at least one
screw element (15) is provided between the door
operator (10) and the mounting plate (11) by means of
which element the door operator (10) is movable on
the mounting plate (11) in the latching direction (14)
and by means of which element the latching means
(12) can be brought into a latched position in the
counter-latching means (13) and/or can be retained in
the latched position.
2. The mounting arrangement according to claim 1,
characterized in that the mounting plate (11) includes

four latching means (12) and in that the door operator (10) includes four counter-latching means (13) associated to the latching means (12), wherein the latching means (12) and the counter-latching means (13) are configured in particular in that the four latching means (12) simultaneously latch in the counter-latching means (13) during a movement of the door operator (10) in the latching direction.

3. The mounting arrangement according to claim 1 or 2, **characterized in that** the latching means (12) are disposed at the mounting plate (11) in pairs opposite each other and/or in pairs next to each other, and in particular in that the latching means (12) provided in pairs are disposed to be spaced apart from each other at the mounting plate (11) in such a way that the distance of the latching means (12) almost corresponds to the principal dimensions of the mounting plate (11).

4. The mounting arrangement according to any of the claims 1 to 3, **characterized in that** the latching means (12) are configured to be spring-resilient and have an inclination in order to provide an elastic bracing of the latching means (12) in the counter-latching means (13) once the door operator (10)

reaches the latched position at the mounting plate (11).

5. The mounting arrangement according to any of the
5 aforementioned claims, **characterized in that** the
counter-latching means (13) have an inclination, such
that the latching means (12) are elastically braced in
the counter-latching means (13), once the door
operator (10) reaches the latched position at the
10 mounting plate (11).
6. The mounting arrangement according to any of the
aforementioned claims, **characterized in that** the door
operator (10) has a housing (16) with an underside
15 reception area (17), in which the mounting plate (11)
can be accommodated, wherein the housing (16)
laterally surrounds the mounting plate (11) if the door
operator (10) is disposed at the mounting plate (11).
- 20 7. The mounting arrangement according to any of the
aforementioned claims, **characterized in that** the
housing (16) has a support area (18), by means of
which the housing (16) bears on the reception
member, if the door operator (10) is located at the
25 mounting plate (11) in the latched position, and in
particular wherein the mounting plate (11) constitutes

a bracing element between the door operator (10) and the reception member.

- 5 8. The mounting arrangement according to any of the
aforementioned claims, **characterized in that** the
housing (16) has guiding means (19) which cooperate
with counter-guiding means (20) of the mounting plate
(11) for guiding the door operator (10) above the
mounting plate (11) in the guiding direction (14).
- 10 9. The mounting arrangement according to any of the
aforementioned claims, **characterized in that** the
housing (16) includes at least one screw reception (21)
against which the screw element (15) can be
15 supported and/or into which the screw element (15)
can be screwed.
- 20 10. The mounting arrangement according to any of the
aforementioned claims, **characterized in that** the
mounting plate (11) includes at least one screw
reception (22) into which the screw element (15) can
be screwed and/or against which the screw element
(15) can be supported.
- 25 11. The mounting arrangement according to any of the
aforementioned claims, **characterized in that** a
connecting element (23) is provided between the

screw element (15) and the mounting plate (11) into which connecting element the screw element (15) can be screwed and which can be in particular positively disposed at the mounting plate (11).

5

12. The mounting arrangement according to any of the aforementioned claims, **characterized in that** the housing (16) of the door operator (10) includes at least one opening (24) through which a tool can pass in order to entrain the screw element (15) into a rotational movement.

10

13. The mounting arrangement according to any of the aforementioned claims, **characterized in that** the mounting plate (11) includes a snap-in element (25), which can be brought into a latching arrangement at the housing (16) of the door operator (10), in particular once the door operator (10) has been brought into the latched position on the mounting plate (11).

15

20

14. A mounting method for mounting a door operator (10) to a reception member such as a door leaf, a door transom, a wall, a ceiling or the like by means of a mounting plate (11), wherein the mounting plate (11) is fastened to the reception member, and wherein the door operator (10) is subsequently mounted to the mounting plate (11), and wherein the mounting plate

25

(11) includes latching means (12) and the door operator (10) includes counter-latching means (13) associated to the latching means (12), and wherein the latching means (12) latch in the counter-latching means (13) for a retaining arrangement of the door operator (10) at the mounting plate (11), in that the door operator (10) is moved on the mounting plate (11) in a latching direction (14), **characterized in that** at least one screw element (15) is disposed between the door operator (10) and the mounting plate (11), and the door operator (10) is movable on the mounting plate (11) in the latching direction (14) by means of the screw element (15) and the latching means (12) are brought into a latched position in the counter-latching means (13) and/or are retained in the latched position by means of the screw element (15).

15. The mounting method according to claim 14, **characterized in that**, prior to activating the screw element (15), the door operator (10) is placed onto the mounting plate (11) and is moved manually in the latching direction (14), in order to latch the latching means (12) in the counter-latching means (13) for a retaining arrangement of the door operator (10) at the mounting plate (11), wherein, in particular following a manual movement of the door operator (10) in the latching direction (14), the screw element (15) is

activated, in order to retain the latching means (12) in the latched position.