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(54) **A method for disengaging a childproof locking device and a childproof locking device**

(57) A child proof locking device and a method for disengaging the same for applications of turnable windows, doors or shutters, provided with swinging arm assemblies. Characterizing for the locking device and the method is that the blocking function is disengaged by that

at least one part of the locking device is actuated by at least two successive steps, where the first step gives access to the second step, to make it more difficult for instance for children to understand and manage the function of disengagement.

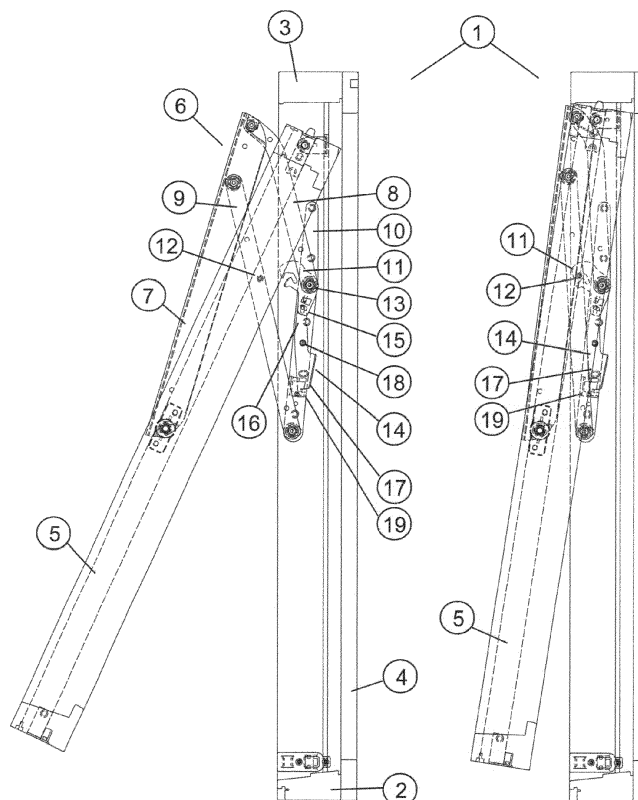


Fig. 2a

Fig. 2b

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Description

Technical field

[0001] Present invention relates to a childproof locking device, also called child lock for turnable windows, doors and shutters, provided with swinging arm assemblies. Turnable refers to turning both in horizontal direction and vertical direction, and accordingly the invention can be applied to both swinging arm assemblies arranged for turning around a horizontal axis and to swinging arm assemblies arranged for turning around a vertical axis.

Background of the invention

[0002] Rules, especial for child safety, for openable windows, balcony doors etc., exists in different forms in different markets. In Sweden is referred to "Regelsamling för byggande (Collection of rules for building), BBR 2008 part 2, Boverkets byggregler (rules for building from the government of building), BBR", and therein it is written:

"8:231 Openable windows, balcony doors etc.

[0003] *In spaces where children can be staying openable windows and glass partitions - i.e. balconies enclosed with glass - whose lower edge of the frame is placed lower than 1.8 meter above the floor must be provided with safety fittings, locking devices or other protections that limits the risk that a child can fall out. Balcony doors and openable windows where the distance between the glass surface and the floor is less than 0.60 meter must be provided with safety fittings and locking devices that prevents children from opening and pass the door or the window. Safety devices mustn't be provided on windows or French doors at the ground level. (BFS 2008:6)*

Generally advice

[0004] *Safety fittings are referred to as a fitting with a stop that fixes for instance a window in closed position. Locking device is referred to as a device with a stop that prevents, for instance a window from being opened more than 10 cm. Both devices should be realized in a way that the stop cannot be removed by children but though be used by persons with reduced ability to move.*

[0005] *Child safety, strength and durability can be controlled according to SS 3587 and NT CONS 018. (BFS 2008:6)"*

[0006] The present invention is focused on what above is called locking device and what has to prevent that a window is opened to more than 10 cm free opening between a part of the casement and the closest lying part of the frame and where disengagement of the lock then permits a further opening of the casement beyond the blocking position. The locking device according to the invention is arranged to make it more difficult for or to

prevent children from disengaging/releasing the stop. For the sake of simplicity windows are used as example in the below description, and where appropriate, windows that are turnable around a horizontal axis, but that don't means that the solution is limited to just this application but the solution comprises also doors, shutters and the like, which are turnable around an axis or an articulated attachment.

[0007] There are several known constructions where the turnable window is provided with a locking device, which below is called child lock. For turnable windows provided with swinging arm assemblies the patent SE 8902843-5 of the applicant exists as an example, where one of the swinging arm assemblies has a child lock which consists of a hook like fitting with a recess in the form of a guiding groove and a nose. The nose guides a holding element, in the form of a shoulder rivet, in the groove and the groove has a position at rest for the rivet in the closed position of the window and a blocking position for the child lock of the window. This solution also has a separate airing blocking element in the shape of a foldable arm, which in the child locked position, is folded out and is clamped between the casement and the frame, whereby the window is prevented from unintentionally being closed. With folded out airing blocking element the window is locked for movements both outwards and inwards relative the frame. The Norwegian NO 320116 builds further on the childproof lock of the Swedish patent but differ from this by that here, instead of the separate outwards foldable arm, an additional, deep groove in the childproof lock is introduced together with the position of childproof blocking, whereby a firm, locked position is obtained where the window is locked in both directions. In that way both the childproof lock and the airing blocking element is obtained with one and the same detail. The applicant also has developed the solution according to SE 8902843-5 further, according to the patent SE 1001178-1, which is a combined child lock and an airing blocking element. In addition there are similar solutions of the market where some form of hook or fitting with a groove indication, hooks in a shoulder rivet or similar holding element, and prevents an opening of the window. Those hooks or hooks provided with grooves are arranged to be turned, lifted or pressed to the side to release the catch and by that permitting the casement to pass the blocking position.

[0008] The problem with the known solutions is that they don't successfully manage the demands that are set according to the standardized testing method NT CONS 018 - WINDOWS AND FRENCH DOORS, CHILD-RESISTANT DEVICES: STRENGTH AND FUNCTION. According to this method the object (the window, door or shutter) is tested, both considering the strength - according to SS 3587, and considering the function - according to the 7 paragraph NT CONS 018, i.e. the function of preventing children in a certain age to open a window for instance. There are solutions of so called child locks that reach the strength demands according to SS 3587, but

no one of the known constructions manage the function test according to NT CONS 018.

[0009] The test is in short made in a way that at least 30 children in the ages of 3-5 year, are picked out so that there are as many girls as boys and where those are equal divided in ages, social, ethnic and cultural background. The test object, below called the window, as an example, is placed in a rig and in a way that the children are able to familiarize oneself with it and to understand that it is allowed to use it. One example is to place it in a kindergarten where the test later can take place. During the test itself every child at first will be informed that they has to try to entirely open the window and then the child will be trying during 5 minutes to open the window without instructions. Thereafter, if the child fails to open the window, the child is allowed to see when the testing instructor opens the window and the blocking device, without instructing how to do it. After that the child gets additionally 5 minutes to try to find out how to open the window. The test is interrupted when the child can open or after that the second 5 minutes period is finished. The results are plotted in a diagram (see figure 1) an implies that if the result is under the line 1-"Limit 1" - the locking device has managed the test and if the result is over the line 2-"Limit 2" - the blocking element hasn't managed the test. Results that lands between the lines means that no conclusions can be drawn in that situation and the test continues with additionally children (in addition to the first 30) until any of the lines are passed or until a maximal amount of 200 children has performed the test. Previously no child locks has managed the test, i.e. managed that the result lands below the line 1, with a satisfactory protection according to the preconditions of the test method. Nevertheless the manufacturer supplies their product with those child locks while they anyway make it more difficult for children to open the window beyond the blocking position. The rules and regulations, according to above, indeed says that "that the risk has to be limited" by openable windows and glass partitions whose lower edge of the frame is placed lower than 1.8 meter above the floor. For Balcony doors and openable windows where the distance between the glass surface and the floor is less than 0.60 meter there must be provided safety fittings and locking devices that "prevents" children from opening or pass the door or the window. In those cases it is usual to provide the fitting with locks in form of a handle provided with key or the like. Accordingly the main problem is that at the market existing children locks don't give an acceptable child proof protection.

Summary of the invention

[0010] With the present invention the aim to solve the problem that the present children locks don't prevents children to cancel the blocking function of turnable windows, doors and shutters is obtained. The stated aim is reached from the first aspect of the invention by that a method where at least one part in the locking device, i.e.

the blocking element or the holding element, is actuated in at least two successive steps or moments, where the first step give access to perform the second step. The aim with this is to make it more difficult, especially for small children to understand how the disengagement of the catch is functioning. By the preferred embodiment of the method an additionally moment then is added for the disengagement compared to older solutions. This is crucial to bring the children safety for catches by turnable windows, doors and shutters further, from that previously only "limited the risk" that a child will be able to cancel the child lock and open the window, door or shutter, with a risk to fall out, to *preventing* children from cancel the catch. In the past always a certain number of children managed to cancel the catch, but the present method prevents, according to the above tests, all children in said ages to cancel the catch, according to the testing method.

[0011] According to a preferred embodiment of the invented method it is the blocking element that is handled in two steps. The blocking element is that fitting part which is a hook-like fitting plate arranged with a recess for the holding element. The blocking element and the holding element are engaged with each other in the blocking position, whereby the casement is blocked for opening beyond the blocking position. The blocking element is according to the embodiment displaceable attached in the frame plate and the disengagement of the blocking function of the locking device is performed by that in a first step the blocking element is displaced in one direction, which allows the second step, by which step the blocking element is displaced in another direction. By way of example is at first the blocking element pressed towards the frame plate and then the blocking element is lifted to fully release the catch. Another example is to first lift and then displace the blocking element outwards, in direction away from the user, or inwards in direction to the user. Other combinations are of course possible according to the preferred embodiment and the blocking element can just as well be arranged on another part of the swinging arm assembly, for instance on some of its swinging arms or on the casement and in that case the holding element is for instance arranged on the frame plate or the frame. By combining at least two steps for the disengagement of the catch a child proof locking device, that achieves the demands according to prescribed norms, is obtained. By that the construction prevents children from disengaging the catch, which previous solution don't manage.

[0012] According to a further preferred embodiment of the method the blocking element is both displaceable arranged on some part of the swinging arm assembly, preferable on the frame plate and moreover articulated attached to the same. By that the disengagement of the blocking function of the locking device is made by first displacing the blocking element in one direction, for instance upwards, downwards, inwards, or outwards, compared to the user, or inwards to the frame plate or outwards from the same. The first step then allows for performing the second step which is performed by turning

the blocking element around the articulated attachment point. By using two different types of moments, displacement and turning, it becomes more difficult for younger children to handle the catch and to understand and perform the moments in the right order and synchronized.

[0013] According to a further preferred embodiment of the method the blocking element is both displaceable and articulated attached on some part of the swinging arm assembly, preferable the frame plate, but in this case the turning of the blocking element is made in the first step, and the displacement in the same way as above but in the second step.

[0014] According to a preferred embodiment of the invented method the locking device also comprises an actuator, which is interconnected with the blocking element. The blocking element is articulated attached to some part of the swinging arm assembly, preferable to the frame plate and further the actuator is articulated attached to the blocking element at a first upper end of the actuator. The second, lower end is free, i.e. not attached in anything, and further the actuator is articulated attached to the same part of the swinging arm assembly, preferable the frame plate, in a point between the first and the second end. By handle the second, free end of the actuator, the blocking element is influenced, via the linkage. According to the method the actuator is displaced, in a first step, in one direction for the purpose to set the actuator in a position where a second moving direction is possible. In a second step it is then possible to perform a movement of the actuator in a second direction, preferable towards the user, which means that the actuator is influenced via the linking with the actuator, whereby the blocking element is turned and accordingly the hook of the blocking element is lifted and then leaves its engagement with the holding element, whereby the catch is disengaged. In the most known constructions of child locks the blocking element or corresponding are difficult to access, which results in problems for persons with reduced ability to move or reach. The function for the actuator is to facilitate the actuation/disengagement of the child lock for those persons. According to this embodiment it is the actuator that is actuated in at least two steps to disengage the blocking function of the locking device and accordingly the child safety is maintained and is even improved and besides the actuating is facilitated for persons with reduced ability to move or reach. Earlier known solutions introduce no solutions that both manage the severe conditions regarding to child safety and gives an increased access for actuation.

[0015] According to a further embodiment of the invented method the locking device comprises, besides above mentioned actuator, also a locking washer. The locking washer is mounted on some part of the swinging arm assembly, preferable on the frame plate, in positional coordination with the second end on the actuator when in its blocking position. The second end of the actuator can be introduced behind the locking washer, i.e. between the locking washer and the frame plate, by that

the locking washer in mounted position forms a space between the frame plate and the surface of extension of the locking washer. The locking washer has an open side where accordingly the actuator can be introduced and at this side the locking washer comprises a locking lug, which is arranged to lock the second, free end of the actuator. This is the blocking position according to the embodiment and by bringing the actuator into the space behind the locking washer the blocking element will mesh with the holding element. When disengagement of the blocking function of the locking device has to be done according to the method of the preferred embodiment, the second end of the actuator is displaced in a first step, in a direction for releasing it from the locking lug, and then it is possible to, in a second step, displace the second end of the actuator in another direction, whereby the actuator influences the blocking element in a way that it is released from the holding element and the blocking function is interrupted. The locking washer moreover covers, in the blocking position, the second end on the actuator and by that the locking lug and the engagement between the locking lug and the actuator is hidden. By that the user has to know or has the ability to understand how the device is disengaged, which is an advantage compared to previous solutions where the blocking mechanism is visible. The hidden catch according to the embodiment gives a further difficulty which makes it more difficult for smaller children, besides that they must actuate the actuator in two steps to release the catch. Further also the locking washer is easy to install afterwards, i.e. by already existing blocking assemblies according to the invention. This means that if for instance a use of a local is changed to a local where children stays, it is easy to complete the locking device with the locking washer whereby the safety level is essential increased, according to the above shown tests. Older solutions don't show this simple and cheap possibility to complete by changed use of the local.

[0016] According to a further preferred embodiment of the invented method the second free end of the actuator has a distance to that part of the swinging arm assembly on which the actuator is articulated arranged, preferable on the frame plate, preferable by a bending located between the second end and the attachment of the actuator to the frame plate.

[0017] This bending makes that the second end of the actuator is angled out from the surface of the frame plate and is accordingly slightly resilient, i.e. the resilience in the material allow for elasticity. In this way the second end will be displaceable towards the frame plate and by pressing in the second end to the frame plate it will be possible to bring in the second end behind the locking washer. When the second end is behind the locking washer, i.e. in the blocking position, and the user releases the actuator, the second end springs out somewhat in the space behind the locking washer. By that one at the second end of the actuator arranged hook meshes with the locking lug and the actuator is accordingly prevented

for a movement that disengages the locking device. To disengage the blocking function of the locking device according to the method, the second end of the actuator is pressed, in a first step, inwards to the frame plate, for releasing from the locking lug, and after that, in a second step, the actuator is displaced in a second direction along the surface of the frame/frame plate, preferable towards the user, whereby the actuator influences the blocking element, via the link, resulting in that the blocking element is released from the holding element and the blocking function is interrupted.

[0018] From the second aspect of the invention the aim is achieved by that a device of the initial specified type has the special characteristics that at least one part of the locking device, i.e. the blocking element or the holding element, is moveable arranged in at least two steps or moments, from its rest position at the blocking position of the device. This implies that when the locking device is in its blocking position, i.e. when the blocking element meshes with the holding element, the catch, alternative the holding element, be displaced or turned, or combinations of those moments, in taken together at least two steps, to cancel the engagement of the blocking element with the holding element. The performance of the first step gives access to performance of the second step. It is also possible, according to the embodiment, to first, in step 1, actuate the blocking element, and then, in step 2, actuate the holding element, or vice versa, to disengage the blocking function of the locking device. By that at least one part of the locking device is moveable arranged in at least two different directions the locking device manage to prevent children in the ages of 3-5 years form disengaging the catch, and by that run the risk of falling out through for instance a window, according to the standardized testing method NT CONS 018. This is the only at the present known construction that has a satisfactory child safety protection according to the testing method. An alternative solution is also imaginable, where a catch at first is released for actuating by means of a separate tool, but this is a worse solution, while it at first is needs a special provided tool or at least a tool, and that this tool must be accessible in the vicinity of the window if it will not be to circumstantial to cancel the catch.

[0019] According to a preferred embodiment of the device it is the blocking element itself that is displaceable arranged in at least two different directions. In the first step the blocking element is displaced lengthwise along the frame, i.e. upwards or downwards, preferable along the frame plate, to make the second step possible. Then, in a second step, the blocking element is displaced in another direction approximately perpendicular to the first direction. This means that the second direction either is across the directions of extension of the frame, inwards or outwards relative the casement, or either inwards to the frame or outwards from the frame. Important is that the first step is followed by a second step and that the combination of those steps makes it more difficult or pre-

vents children from disengaging the child lock.

[0020] According to a further preferred embodiment the blocking element is firstly displaced in a direction across the longitudinal direction of the frame, to make the second step possible. Then, in another step, the blocking element is displaced approximately perpendicular relative the first direction. This means that the second direction, for instance, is in the direction along the directions of extension of the frame, for instance upwards or downwards along the frame plate if this is mounted on the side frame or either inwards to the frame or outwards from the same.

[0021] According to a preferred embodiment the blocking element is displaced at first in a direction inwards to the frame, to make the second step possible. Afterwards, in a second step, in a direction approximately perpendicular to the first direction. By that the second direction, in which the blocking element is displaced, constitutes a movement along the surface of the frame/frame plate.

[0022] According to a preferred embodiment the blocking element is displaced first in a direction outwards to the frame, to make the second step possible. Afterwards, in a second step, in a direction approximately perpendicular to the first direction. By that the second direction, in which the blocking element is displaced, constitutes a movement along the surface of the frame/frame plate.

[0023] According to a preferred embodiment the blocking element is articulated attached in the frame plate, which means that the blocking element can be turned around the link. Moreover the blocking element is displaceable arranged along the articulated attachment. This means that the two steps that has to be performed for disengagement of the blocking function of the locking device, according to the aim of the invention, will be selectable concerning in which order they has to be performed. For instance, in a first step, the blocking element is turned to a position where the second step will be possible, and then to perform the second step - the blocking element is displaced in direction along the axis of rotation. Of course also a reversed order is entirely possible, depending on how the application is selected.

[0024] All above described and preferred embodiments has the principal advantage compared to previous solutions, as mentioned above, namely that they manages the standardized testing method NT CONS 018, and accordingly prevents children from disengaging the blocking function of the locking device.

[0025] An alternative to that the blocking element or the holding element, or their combination, are directly actuated, for disengagement of the blocking function, is to provide the blocking element with an actuator. In previous solution, which only comprises any type of blocking element and holding element, the placement of those often is inaccessible. This in itself often has an explanation in that the child lock isn't totally secure, i.e. that a certain number of children manage to cancel the catch, and in that case the function or result will be somewhat more secure if the catch is made more difficult to access.

Previous solutions introduces constructions where the catches are high located and/or are difficult to access in one or another way. This means that not only children but also persons with reduced ability to move, for instance handicapped, chairbound or elderly have difficulties to reach the catch and to manage to disengage it. By providing the blocking element with an actuator, preferable in the form of an operating arm, which works as a lengthening of the blocking element, it will be considerable easier to access and reach and to manage to disengage the blocking element of the locking device. The blocking element is according to the preferred embodiment, articulated attached to a part of the swinging arm assembly, preferable the frame plate, and in the blocking position the blocking element meshes with the holding element by a hook-like design, just as by the above described variants. The blocking element is disengaged from the holding element by that the blocking element is turned around its link, and by that the blocking element is lifted away from the holding element and the blocking function is ended. Furthermore the actuator is articulated attached to the blocking element, at its first, upper end, the end that is closest to the blocking element. Furthermore the actuator comprises a second free end, i.e. it isn't fixed arranged in any other part. Between the first and the second end the actuator also is articulated attached to the frame plate, according to the preferred embodiments. By actuating the actuator, preferable with a movement along the frame plate, in direction to the user, the blocking element is lifted away from the holding element by the interconnection with the actuator, and the blocking function is interrupted. In this embodiment it is the actuator that has to be actuated in two steps, where the performance of the first step gives access or possibility to perform the second step, in which the actuator influences the blocking element via its movement and via its linkage, whereby the blocking element is released from the holding element. This solution has the same aim and result as above mentioned method and alternative solutions, and solve by that also the principal problem with previous solutions.

[0026] According to a preferred embodiment of the just above alternative solution the first step comprises a movement of the second, free end of the actuator towards that part of the swinging arm assembly in which the actuator is articulated attached, preferable the frame plate. To make this possible the actuator comprises an upsetting, bending or folding, just below its articulated attachment point to the frame plate, i.e. at the side of the attachment point that is closest to the second, free end. By that the second end will be situated at a distance from the frame plate and has moreover certain resilience, because of the lever that is formed between the attachment point and the second end. It will then be possible to, in the first step, press the actuator towards the frame plate and it will then be possible to perform the second step, in which step the actuator is brought in direction along the frame plate and influences the blocking element that then is released from the holding element. In its uninflu-

enced position, i.e. before the first step is performed, the actuator is locked for the moment that releases the blocking function in the second step.

[0027] According to a further preferred embodiment the locking device also comprises a locking washer, which is arranged to lock the movement of the actuator in the blocking position, i.e. to prevent that the second step can be performed before the actuator is released from the engagement of the locking washer with the actuator. The locking washer is mounted on a part of the swinging arm assembly, preferable the frame plate, at the height of the position for the second end of the actuator, the end that is actuated in at least two steps, according to the embodiment. The locking washer has in its mounted position a distance to the frame plate, and this distance constitutes a so called lock space, and the actuator can be introduced between the locking washer and the frame plate, by bringing the actuator forwards from its unblocked position, towards the lock space, and at the same time be pressed inwards, to the frame plate. When the second end of the actuator enters the space between the locking washer and the frame plate, in the lock space, the blocking element is at the same time engaged with the holding element, by that the actuator and the blocking element are linked together, and now the locking device is in its blocking position. When the actuator is released, it springs out towards the locking washer and a locking lug provided on the locking washer prevents that the actuator can leave the space, by that a hook at the second end of the actuator is engaged with the locking washer. By the disengagement of the catch the actuator accordingly must, in a first step, be pressed towards the frame plate to be released from the locking lug and, in a second step be displaced/drawn towards the user. In the second step the blocking function is disengaged by the movement of the actuator. Accordingly a blocking function, which is disengaged by at least two steps, is obtained. Moreover the locking washer hides how the actuator is locked in the blocking position, which makes it more difficult for younger children to understand the function, compared to previous solutions where the parts and the engagements are visible.

[0028] According to a preferred embodiment the locking lug comprises a first side arranged at the opening of the locking washer for the actuator. This first side has a chamfering, a wedge-shape, with its pointed part closest to the opening. The chamfering is to make it make it easier to control the actuator in to the space between the locking washer and the frame plate. Moreover the locking washer comprises a second opposite side, relative the first side, and the second side of the locking lug is arranged to block the movement of the actuator backwards to the user. While the actuator is arranged behind the locking washer and is released, the second end of the actuator springs out against the locking washer and by that the hook lands on the second end of the actuator, behind the second side of the locking washer and by that the actuator is locked for actuating/disengaging the locking device. The

angle between the second side of the locking lug and the surface of the locking washer is approximately perpendicular, which results in that the second side forms a preventing wall, a stop edge, which locks the movement of the actuator in parallel with the locking washer. Accordingly the first step to disengage the blocking function of the locking device is to first press the second end of the actuator inwards, in direction to the frame plate, for releasing from the locking lug. Then, in the second step, the second end of the actuator is brought along the frame plate towards the user and by that the actuator influences the blocking element, via its articulated attachment to the same, whereby the blocking element is released from its engagement with the holding element.

[0029] According to a preferred embodiment the stop edge of the locking lug a slight chamfering or sloping. The stop edge of the locking lug is according to this alternative not totally perpendicular to the plane part of the locking washer, but slight sloping with a larger angle than 90 degrees between the plane part and the surface of the stop edge. The reason for this embodiment is that if the actuator is behind the locking washer and is locked by the locking lug, by open window but unblocked position, i.e. an open position beyond blocked position, and the window then is closed, it will be prevented that the hook of the actuator is attached behind the stop edge of the locking lug by the slightly sloping. The sloping results in that when the driving force arise at the actuator, by the closing of the window, the hook slides up from the locking lug without that the material of the locking lug is damaged.

[0030] According to a preferred embodiment the locking washer comprises a guiding lug, provided at the outside of the locking washer, i.e. the opposed side of the plane surface of the locking washer, relative the lock space. The lock space can, as known, be told as being provided at the inside of the locking washer, because the locking washer is mounted for instance on the frame plate. This guiding lug is arranged to be in contact with the lower swinging arm at the end phase of the closing of the window, and at that time the lower swinging arm will slide upwards on the guiding lug and presses as a result this part of the locking washer against the second end of the actuator inwards to the frame plate. Hereby the first step occurs, i.e. the second end of the actuator and its hook is lifted from the locking lug, and so by complete closing, the hook can pass upwards beyond the stop edge and then the second step can occur - a movement in direction along the locking washer and the hook can approach the tip of the wedge-shaped locking lug at the rear edge at the locking washer. The blocking element, and by that the actuator, is moved during the closing phase as a result of the movement of the holding element in the recess of the blocking element. Understandably the functions occur reversed by opening the window. Accordingly there is no wear at the stop edge of the locking washer.

[0031] According to a further preferred embodiment the blocking function of the locking device is disengaged

by that the actuator, in the blocking position, i.e. in its position behind the locking washer, is moveable arranged in a first direction inwards to the frame plate, for releasing of the hook of the actuator from the locking lug.

5 The actuator is in the blocking position clamped and locked behind the locking lug via the springiness or resilience in the material, while the actuator is bended and its second end consequently has a distance to the frame plate. In the first step then the second end of the actuator is pressed, preferable inwards to the frame plate, where-
10 by the engagement with the locking lug is interrupted. In that way the actuator is set into position for the second step - where the actuator is brought in a second direction, along the frame plate and towards the user, i.e. inwards to the room/local. By that the blocking function of the locking device is disengaged by that the movement of the actuator influences the blocking element, via the interconnection, and the blocking element is lifted from the holding element, whereby the catch is disengaged.

20 **[0032]** By the invention a number of advantages compared to known solutions are obtained:

- The locking device manages to prevent children from disengaging the catch, according to the standardized testing method NT CONS 018, where other blocking devices only makes the disengagement more difficult.
- The locking device is more user friendly than previous blocking devices depending on the control arm, which is especially important for persons with reduced ability to move and though the security level is higher than older solutions.
- The locking device automatically turns over to blocking position when the window, door or shutter is closed.
- The actuating in several steps, which is important for a good security, is done by actuating of only one detail - the actuator, the blocking element or the holding element.
- The construction is prepared for mounting afterwards of the locking washer, which makes it possible to afterwards complete with the increased security level, if for instance the use of a local is changed and an increased need of security arises. The locking washer is a simple and cheap detail that is easy to mount.

Brief description of the drawings

50 **[0033]** In detail represents in diametrical, partly schematic cross sections or perspective views:

- Figure 1 shows an evaluation diagram from the testing method NT CONS 018.
- Figure 2a-b shows a cross section through a complete frame provided with the child proof locking device at different grades of opening at the casement.
- Figure 3 shows the right side part of the frame com-

prising a complete swinging arm assembly comprising the child proof locking device.

- Figure 4a shows a complete swinging arm assembly with the child proof locking device.
- Figure 4b-e shows the detail design of the locking washer in views and cross section.
- Figure 5a-b shows the parts of the locking device in connection with closing of the window.
- Figure 6a-b shows the upsetting of the actuator relative the frame plate.

[0034] The constructive design of the present invention is shown in the below detailed description of examples of embodiments of the invention with reference to the accompanying figures that shows a preferred, but not limiting example of embodiment of the invention. Moreover the invention brings the state of the art further in different respects. This is realized in present invention by that the device of the below described type preferable is constituted in a way that is evident from the characterized part of claim 1.

Detailed description of the drawings

[0035] Figure 1 shows an evaluation diagram from the testing method NT CONS 018-WINDOWS AND FRENCH DOORS, CHILD RESISTANT DEVICES; STRENGTH AND FUNCTION. The test means that every child at first gets to know that they will try to fully open the window and then the child will try during 5 minutes to open the window without instructions. Thereafter, if the child fails to open the window, the child is allowed to see when the testing instructor opens the window and the blocking device, without instructing how to do it. Thereafter the child gets 5 minutes more to try to find out how the window will be opened. The test is interrupted when the child manages to open or after the second 5-minutes period is finished. The results of the tests are plotted according to the example where a one means that the child didn't manage to open the window and a two means that the child managed to open the window within the time limit. If the result for the 30 children is under the line 1 - "Limit 1" - the locking device has managed the test and if the result is over the line 2 - "Limit 2" - the blocking element hasn't managed the test. Results that lands between the lines means that no conclusions can be drawn in that situation and the test continues with additionally children, in addition to the first 30, until any of the lines are passed or until a maximal amount of 200 children has performed the test.

[0036] Figure 2a shows a cross section through a complete frame 1 which comprises a lower part 2, an upper part 3, and two side parts 4. In the side parts a casement 5, preferable a window casement is hinged suspended by two mirror symmetrical equal swinging arm assemblies 6. The swinging arm assemblies 6 comprises each an exterior assembly arm 7, whose lower part is articulated attached to the casement 5. Moreover the swinging

arm assembly 6 comprises an upper swinging arm 8 which in its upper end is articulated attached at the upper end of the exterior assembly arm 7. The lower end of the upper swinging arm 8 is also articulated attached to one in the frame fixed arranged frame plate 10. The swinging arm assembly 6 further also comprises a lower swinging arm 9 which also is articulated attached at the upper end of the exterior assembly arm 7, but below the attachment of the swinging arm 8. In addition the lower swinging arm 9 also is articulated attached to the lower end of the frame plate 10. At the articulated attachment point of the upper swinging arm 8 against the frame plate 10 is a blocking element 11 articulated attached to the frame plate 10 via a first link 13. The blocking element 11 is further interconnected with an actuator 14, via a second link 15 provided at the upper first end 16 of the actuator 14. The second end 17 of the actuator 14 is free and displaceable in at least two directions, preferable in direction inwards to the side part 4 of the frame and in direction along the surface of the frame plate 10, i.e. inwards and outwards seen from the point of view of the user. The actuator 14 is articulated attached to the frame plate 10 by a third link 18, which is located between the first end 16 and the second end 17 of the actuator. At the lower swinging arm 9 a holding element 12 is arranged, which preferable is a shoulder rivet or the like and the blocking element 11 is arranged to grab around the holding element 12 for blocking function. According to the figure the window is in a position where the blocking element 11 doesn't meshes with the holding element 12 but is opened to a larger grade of opening, i.e. an opening where the dimension between the lower part 2 and the frame and the lower part of the casement 5 is larger than 10 cm. In this position the window isn't blocked for movement but hinged moveable around its links either inwards to the frame 1 to blocked position or further to closed position alternative continued movement outwards to a larger grade of opening or to turned around position - approximate 180 degrees - in a position for window-cleaning or the like. In The figure is also visible a locking washer 19, which is mounted on the frame plate 10 in position at the lower, second end 17 of the actuator. The locking washer 19 is designed in a way that it in mounted position has a lock space 28 (see fig 4b-e) between the locking washer 19 and the frame plate 10, in which lock space 28 the actuator 14 is introduced for locking of the free, second end 17 of the actuator.

[0037] Figure 2b shows the frame 1 with the casement 5 in its blocked position, which is a combined position for child lock and airing. The child lock means that the casement 5 is blocked for a movement outwards relative the frame 1 and is a fixed position against a movement outwards, which is a security requirement according to existing norms. In this position the blocking element 11 comes, via one in the blocking element made recess in engagement with the holding element 12, by that the recess comprises a notch provided for the holding element 12. The locking washer 19, at the lower, second end 17

of the actuator, is arranged to lock the movement of the actuator 14 in the blocking position which means that the second end 17 of the actuator firstly must be brought inwards to the frame plate 10 to be disengaged from a locking lug 20 with a stop edge 30 provided at the locking washer 19 (see figure 4b-e), before the actuator 14 can be actuated, preferable in direction inwards to the user, to disengage the blocking element 11 from the holding element 12, via the link assembly. After disengagement of the child lock it is free for the user to let the actuator 14 be left in the actuating position or bring the free, second end 17 back behind the stop edge 30 of the locking washer 19. According to the figure the actuator 14 is in its locked position, i.e. the second end 17 is locked by the locking washer 19. By closing the window the actuator 14 will automatically be introduced in the lock space 28 behind the stop edge 30 of the locking washer, if it not already is there, which is explained later in connection with the figures 4a-e. Further, by closing, the holding element 12 automatically additionally will be introduced in the recess of the blocking element 11 whereby the blocking position automatically is engaged by closing. This means that next time when the window is opened the device with secure child lock already is activated by that both the blocking element 11 and the actuator 14 is in the blocked position, and for disengaging it at least two steps of actuating the actuator 14 is necessary for the disengagement of the blocking function, where the first step gives access to the second step.

[0038] In figure 2a the blocking element 11 is disengaged from the holding element 12 by means of the actuator 14 in the above described way, the casement 5 has leaved the blocking position. Details around the design of the locking washer 19 and how the locking of the actuator 14 is made will be explained in connection with figures 4a-e.

[0039] Figure 3 shows the right side part 4 of the frame comprising the fixed arranged frame plate 10, and in this the articulated attached upper and lower swinging arms 8, 9, and those articulated attachments to the extern assembly arm 7. Moreover a part of the casement 5 is visible which, as in usual applications with swinging arm assemblies, are linear guided at its upper part by one in a slide bar 35 arranged guide shoe 36. At the attachment point of the upper swinging arm to the frame plate 10 - the first link 13 - also the blocking element 11 is articulated attached to the frame plate 10. The articulated attachment permits a rotary movement of the blocking element 11 around the link 13, but this movement is limited by a lug 37, which protrudes from the surface of the frame plate 10, upwards through a recess 38 in the blocking element. Further the actuator 14 is articulated attached to the frame plate 10 by the third link 18, around which the actuator 14 can be rotated. The actuator 14 in turn is linked together with the blocking element 11, via the second link 15, between the upper, first end 16 of the actuator and the lower part of the blocking element. By the interconnection in the second link 15 and by the articulated

first and third links 13, 18 a rotary movement is transferred from the actuator 14 to the blocking element 11, and vice versa. The freedom of movement is limited taken together for the parts by the lug 37 and the recess 38 in the blocking element 11 and by that accordingly also the movement of the actuator 14 is limited, implying that its second end 17 never totally leaves the locking washer 19. Above the articulated attachment of the lower swinging arm 9 to the frame plate 10, and in coordination by position with the second end 17 of the actuator, the locking washer 19 is fixed mounted to the frame plate 10. By that the locking washer has a distance between its plane part 21 and the frame plate 10, a lock space 28 is formed (see figure 4b-e) between them. Moreover the locking washer 19 has an opening to the lock space 28 through an open upper edge 26 and rear edge 27 through which the second end 17 of the actuator is introduced. In the figure is showed that the second end 17 of the actuator is behind the locking washer 19, in the lock space 28, whereby the actuator 14 is locked and accordingly the satisfactory child security is in force.

[0040] Figure 4a shows the complete swinging arm assembly 6 comprising the frame plate 10, extern assembly arm 7, upper and lower swinging arm 8, 9, the blocking element 11, the actuator 14, and the locking washer 19. The swinging arm assemblies are used in pairs and are then mirror symmetrical equal, with the preferred embodiment that the blocking element 11 and the actuator 14 is mounted only on the one swinging arm assembly 6. The blocking element 11 is as is described above articulated attached to the frame plate at the first link 13, and preferable comprises the construction also a clamped spring (not visible) around the link 13, which is linked together with the blocking element 11 in a way that this attempts to snap against the holding element 12 when this entries the recess of the blocking element, by closing the window, for better secure that the child lock will lock. By that the recess in the blocking element 11 is adapted to guide and turn the blocking element 11 when the holding element 12 entries, and is moved in the recess, the blocking element 11 obtains the positions that are necessary for the blocking position of the window and its totally closed position, respective, and positions between those. The movement of the blocking element, by closing the window, can be described as that the blocking element 11 first is lifted when the holding element 12 lands on its outer edge, its nose, and sinks then somewhat when the blocking element 11 snaps against the holding element 12/is guided by the groove and at the end of the movement the blocking element 11 is lifted again to an almost upright position, by the totally closed position of the window and the rest position of the blocking element 11. The movement pattern is by opening the reversed. As is described above the blocking element 11 is interconnected with the actuator 14 via the second link 15 and further the actuator 14 is articulated attached to the frame plate via the third link 18. Accordingly by the interconnection between the actuator 14 and the blocking de-

vice 11 also the actuator 14 will move concurrently with the movement of the blocking element by closing and opening, respectively. According to the figure the second end 17 of the actuator is locked behind the locking device 19 and as is visible in the figure, the locking washer 19 hides how the locking/disengagement of the actuator 14 is made, which makes it more difficult for children to understand how the child lock is disengaged. The locking washer 19 is preferable rivet or screwed to the frame plate and is very easy to complete afterwards by that the frame plate 10 is prepared with recesses for the fixed arrangement of the locking washer.

[0041] Figure 4b-e shows the locking washer 19 in perspective, in plane from underneath, and in cross section. The locking washer 19 can very easy be described by referring to its mounted position on the frame plate 10, where upper, lower, front, rear refer later in the description to its mounted position relative the frame 1 and from the users point of view from inside to outside. The locking washer is preferable a plastic detail which comprises the plane part 21, which is principally parallel to the frame plate 10. Moreover the locking washer 19 comprises a front edge 22, with a front wall 23, and a lower edge 24, with a lower wall 25. These two walls 23, 25 connects in mounted position to the frame plate 10 whereby a distance is formed between the frame plate 10 and the plane part 21 of the locking washer. The upper edge 26 and lower edge 27 of the locking washer 19 are open in a way that the actuator 14 can be introduced behind the locking washer 19, see figure 4a. The space that is formed between the frame plate 10 and the locking washer 19 is, according to above description, called the lock space 28. To achieve the satisfactory protection from the child safety point of view the actuator 14 must be locked so that its movement in parallel with the frame plate 10 is prevented and consequently that the blocking element is prevented from being disengaged from the holding element 12. To prevent this possibility to movement the actuator 14 is introduced in the lock space 28, through the upper and back edge 26, 27 of the locking washer.

[0042] The actuator 14 is in its extending somewhat angular changed, for instance by a bending or folding (see figure 6a-b) which means that the actuator 14 can be pressed inwards to the frame plate 10. Thanks the angular changing or the bending the second end 17 of the actuator is at a distance from the frame plate 10 in unloaded state and it will be possible to press the second end 17 of the actuator inwards to the frame plate 10 depending on the resilience in the material. At the rear edge 27 of the locking washer at the entry to the lock space 28 the wedge-shaped locking lug 20 is arranged, with its tip 29 closest to the opening at the rear edge 27 of the locking washer. The chamfering is made to facilitate the guiding the actuator 14 to the lock space 28 and further to the opposite edge of the locking lug, the stop edge 30, which is provided to prevent the movement of the actuator 14 outwards from the lock space 28, thanks the resilience

in the material of the actuator 14, the second end 17 springs out in direction from the frame plate 10, when the pressing force is interrupted, and by that a hook 31, that is arranged at the second end of the actuator (see figure 5a-b) lands behind the stop edge 30. By that the actuator 14 is prevented to leave the lock space 28. By releasing the locking of the actuator 14 at first the second end 17 of the actuator must be pressed towards the frame plate 10, whereby the hook 31 is free from the stop edge 30 and accordingly it is possible to bring the second end 17 of the actuator towards the user, which via the interconnection with the blocking element 11, results in that the blocking element 11 leaves its engagement with the holding element 12 and the child lock is disengaged. When the child lock is disengaged the actuator 14 normally is in an unlocked position, i.e. isn't locked behind the stop edge of the locking lug, but resting instead immediately inside the rear edge 27 of the locking washer 19, at the tip 29 of the locking lug. The actuator 14 can never completely leave the locking washer 19 depending on the limiting of the movement via the coordinated lug 37 and recess 38 of the locking device. On the other hand it can happen that the user by disengagement of the child lock return the second end 17 of the actuator to its locked position behind the stop edge 30 of the locking washer. For this reason the stop edge 30 of the locking lug is not totally perpendicular to the plane part 21 of the locking washer, but slightly sloping with a larger angle than 90 degrees between the plane part 21 and the surface of the stop edge 30. So if the actuator 14 is behind the locking washer 19 and is locked by the stop edge 30 of the locking lug, at opened window but not blocked position, i.e. an open position beyond blocked position, and the window then is closed, it is prevented that the hook 31 of the actuator is caught behind the stop edge 30 of the locking lug by the small sloping. The sloping makes that when the urging force arises in the actuator via the movement of the blocking element, at the closing of the window, the hook 31 slides up from the locking lug 20 without damaging the material in the locking lug 20. When the window begins to close from a position beyond blocked position, the holding element 12 automatically enters the recess in the locking element 11 when the parts contacts each other, by that the blocking element 11 in that case is somewhat lifted, which has been described above, and permits a passage for the holding element 12 into the recess of the blocking element 11. Then, at continued closing the blocking element 11 will, as is described above, sink a little when it in blocking position snaps against the holding element 12, and then again be lifted gradually until its rest position by completely closed window. Because the actuator 14 and the blocking element 11 are interconnected via the second link 15, also the actuator 14 moves. If it in that moment would be in the way that the user has brought the actuator 14 into locked position behind the locking washer 19, after opening beyond the blocking position, the sloping at the surface of the stop edge 30 permits, when the window is closed,

and the movement of the blocking element 11 between blocking position and rest position urge the actuator 14 to movement, that the hook 31 and the second end 17 of the actuator is lifted towards the frame plate 10 and then leaves the locked position. The locking washer isn't damaged by that by breaking or the like depending on that the hook 31 may get caught against the stop edge 30. However the sloping at the stop edge 30 is completely satisfactory to block the movement of the actuator 14 at the child locked position, i.e. the partly opened position, when the blocking element 11 is engaged with the holding element 12. By the chamfering it will be no damage of the material at the stop edge 30 of the locking lug, which would be the case if there were no sloping.

[0043] A further finesse to avoid wearing of the locking washer 19, is a guiding lug 32 provided on the outside of the plane part 21 of the locking washer. When the window is closed, both the blocking element 11 and the actuator 14, as is described above, will move depending on the position of the holding element 12 in the recess of the blocking element 11, and the second end 17 of the actuator will, during this movement, at first leave the stop edge 30, during the last phase when the blocking element 11 goes to rest position closest to upright position. At the same time as the finishing phase of the closing movement is done, the lower swinging arm 9 is coming closer to the locking washer 19, and will come to slide upwards on the guiding lug 32, which then automatically presses the second end 17 of the actuator inwards to the frame plate 10. In this way the guiding of the actuator 14 is facilitated by its movement during closing and opening, respective, and there is no wearing of the locking washer.

[0044] To facilitate the mounting of the locking washer 19 in the frame plate 10 there is in the lower wall 25 of the locking washer a protruding mounting lug 33, which by dimension is coordinated with a corresponding recess in the frame plate 10. The mounting lug 33 comprises also a through recess 34 for fixed anchoring of the locking washer 19 to the frame plate 10 for instance with a pop rivet or a screw.

[0045] Figure 5a-b shows the locking device in cross section in two different positions, the blocking position and the beginning of closing the window. The casement 5 is according to figure 5a in its blocked position where the blocking element 11 is in engagement with the holding element 12. In this position the actuator 14 first has to be pressed inwards to the frame plate 10 to release the hook 31 from the locking washer 20. This is the first step for disengaging the child lock. After that it is possible to perform the second step, namely to bring the actuator 14 towards the user, whereby the blocking element 11 is lifted from the holding element 12 via the linking at the second link 15. In figure 5b the window is going to be totally closed and by that the actuator 14 is automatically brought into the lock space 28, behind the stop edge 30, at the same time as the holding element 12 by the closing movement automatically is brought into the recess in the blocking element 11. The automatic function in the above

moments is made possible partly by the design of the blocking element 11 which guides the holding element 12 into the recess, and also the design of the locking washer 19 that guides the actuator 14 into the lock space 28, among other things by the guiding lug 32 and the wedge-shape at the locking lug 20.

[0046] Fig 6a-6b shows the upsetting or changing of the angle/bending of the actuator 14 relative the frame plate 10. The upsetting is arranged between the articulated attachment of the actuator 14 to the frame plate 10 and the second end 17 of the actuator. In this simple way resilience is obtained in the material, which is used for the safety function, i.e. the first step of the disengagement of the child lock. In figure 6a the second end 17 of the actuator is pressed towards the frame plate whereby the hook 31 on the actuator 14 can pass the locking lug 20 of the locking washer 19 to engaging or disengaging of the first step. In figure 6b the actuator 14 is unloaded and accordingly its second end 17 and the hook 31 is sprung out and is behind the locking lug 20, whereby the movement along the frame plate 10 is prevented and accordingly the child lock cannot be disengaged.

Component list

[0047]

- | | |
|----|-------------------------------------|
| 1 | frame |
| 2 | lower part of the frame |
| 30 | 3 upper part of the frame |
| 4 | side part of the frame |
| 5 | casement |
| 6 | swinging arm assembly |
| 7 | outer assembly arm |
| 35 | 8 upper swinging arm |
| 9 | lower swinging arm |
| 10 | frame plate |
| 11 | blocking element |
| 12 | holding element |
| 40 | 13 first link |
| 14 | actuator |
| 15 | second link |
| 16 | first end of the actuator |
| 17 | second end of the actuator |
| 45 | 18 third link |
| 19 | locking washer |
| 20 | locking lug |
| 21 | plane part of the locking washer |
| 22 | front edge of the locking washer |
| 50 | 23 front wall of the locking washer |
| 24 | lower edge of the locking washer |
| 25 | lower wall of the locking washer |
| 26 | upper edge of the locking washer |
| 27 | rear edge of the locking washer |
| 55 | 28 lock space |
| 29 | top of the locking lug |
| 30 | stop edge of the locking lug |
| 31 | hook |

32 guiding lug
 33 mounting lug
 34 recess
 35 slide bar
 36 guide shoe
 37 lug
 38 recess

Claims

1. Method of disengaging a locking device for turnable windows, doors and shutters, comprising a frame (1), with a lower part (2), a top part (3) and two side parts (4), and a casement (5), and where the casement (5) is hinged suspended in the frame (1), preferably in the side parts (4) of the frame, by two complete swinging arm assemblies (6) articulately arranged on the casement (5), and where each one of the swinging arm assemblies (6) comprises an outer assembly arm (7), an upper swinging arm (8) and a lower swinging arm (9), and further one in the frame (1) fixed arranged frame plate (10), in which the swinging arms (8, 9) are articulately attached, and the locking device is arranged at the at least one swinging arm assembly (6), and the locking device is arranged to make the opening of said casement (5) more difficult, beyond a partly open position, a blocking position, and the locking device comprises at least one blocking element (11) and at least one holding element (12), and the blocking element (11) prevents the movement of the casement (5) beyond the blocking position, by that the blocking element (11) in the blocking position meshes with the holding element (12), **characterized in that** the blocking function of the locking device is disengaged by that at least one part of the locking device is actuated by at least two successive steps, to make it more difficult, for instance for children, to understand the function of disengagement.

2. Method according to claim 1, **characterized in that** the disengagement of the blocking function of the locking device is made by that in a first step the blocking element (11) is displaced in one direction and thereafter, in a second step, the blocking element (11) is displaced in another direction relative the direction of the first step.

3. Method according to claim 1, **characterized in that** the blocking element (11) is articulately attached to the swinging arm assembly (6) via a first link (13), and that the disengagement of the blocking function of the locking device is made by that in a first step, the blocking element (11) is displaced in one direction and thereafter, in a second step, the blocking element (11) is turned around the first link (13).

4. Method according to claim 1, **characterized in that** the blocking element (11) is articulately attached to the swinging arm assembly (6) via the first link (13), and that the disengagement of the blocking function of the locking device is made by that in a first step the blocking element (11) is turned around the first link (13), and thereafter, in a second step, the blocking element (11) is displaced in one direction.

5. Method according to claim 1, **characterized in that** the blocking element (11) is articulately attached to the swinging arm assembly (6) via the first link (13), and that the blocking element also comprises an actuator (14), with which the blocking element (11) is actuated, by that the actuator (14) is interconnected with the blocking element (11), via an articable attachment, a second link (15), which link (15) is arranged between a first end (16) of the actuator and the blocking element (11), and further the actuator (14) comprises a second free end (17), which is displaceable in at least two directions, and between the first end (16) and the second end (17) the actuator (14) is articulately attached to the swinging arm assembly (6), via a third link (18), and the disengagement of the blocking function of the blocking element is made by that the second end (17) of the actuator, in a first step is displaced in one direction and then, in a second step, is displaced in another direction relative the first direction, whereby the movement of the actuator (14), by the interconnection with the blocking element (11), via the second link (15), influences the blocking element (11) and with that the blocking element (11) is released from the holding element (12) and the blocking function is interrupted.

6. Method according to claim 5, **characterized in that** the locking device comprises a locking washer (19), provided on the swinging arm assembly (6), and where the locking washer (19) according to position is coordinated with the second end (17) of the actuator, at the blocking position of the locking device, and where the locking washer (19) comprises a locking lug (20), arranged to block the actuator (14) in the blocking position, and the disengagement of the blocking function of the locking device is made by that the second end (17) of the actuator, in a first step is displaced in a first direction for releasing the second end (17) of the actuator from the locking lug (20) and then, in a second step the second end (17) of the actuator is displaced in a second direction relative the first direction, whereby the movement of the actuator (14), via the interconnection with the blocking element (11), influences the blocking element (11) and releases by that the blocking element (11) from the holding element (12) and the blocking function is interrupted.

7. Method according to any one of the claims 5 or 6, **characterized in that** the second end (17) of the actuator in a first step is pressed towards that part of the swinging arm assembly (6) in which the actuator (14) is articulated attached via the third link (18), and then, in a second step a movement is performed with the second end (17) of the actuator in direction, mainly along the surface of the frame (1), whereby a turning movement of the actuator (14) around the third link (18) is obtained, and by that the first end (16) of the actuator influences the blocking element (11), via the second link (15), whereby the blocking element (11) is released from the holding element (12) and the blocking function is interrupted.

8. A locking device for turnable windows, doors and shutters, comprising a frame (1), with a lower part (2), a top part (3) and two side parts (4), and a casement (5), and where the casement (5) is hinged suspended in the frame (1), preferably in the side parts (4) of the frame, by two complete swinging arm assemblies (6) articulately arranged on the casement (5), and where each one of the swinging arm assemblies (6) comprises an outer assembly arm (7), an upper swinging arm (8) and a lower swinging arm (9), and further one in the frame (1) fixed arranged frame plate (9), in which the swinging arms (8, 9) are articulately attached, and the locking device is arranged at the at least one swinging arm assembly (6), and the locking device is arranged to make the opening of said casement (5) more difficult, beyond a partly open position, a blocking position, and the locking device comprises at least one blocking element (11) and at least one holding element (12), and the blocking element (11) is arranged to prevent the movement of the casement (5) beyond the blocking position, by that the blocking element (11) in the blocking position meshes with the holding element (12), **characterized in that** at least one part of the locking device is moveable arranged in at least two different steps from its position of rest in the blocking position of the casement.

9. Locking device according to claim 8, **characterized in that** the blocking element (11) is displaceable arranged in a first direction along the longitudinal direction of the frame (1), and is further displaceable arranged in a second direction approximately perpendicular to the first direction.

10. Locking device according to claim 8, **characterized in that** the blocking element (11) is displaceable arranged in a first direction across the longitudinal direction of the frame (1), and is further displaceable arranged in a second direction approximately perpendicular to the first direction.

12. Locking device according to claim 8, **character-**

ized in that the blocking element (11) is displaceable arranged in a first direction, inwards from the frame (1), and is further displaceable arranged in a second direction approximately perpendicular to the first direction.

12. Locking device according to claim 8, **characterized in that** the blocking element (11) is displaceable arranged in a first direction, outwards from the frame (1), and is further displaceable arranged in a second direction approximately perpendicular to the first direction.

13. Locking device according to claim 8, **characterized in that** the blocking element (11) is articulated attached to the frame plate (10), via a first link (13), and by that the blocking element (11) is turnable around the first link (13), and further the blocking element (11) is axially displaceable along the first link (13).

14. A locking device for turnable windows, doors and shutters, comprising a frame (1), with a lower part (2), a top part (3) and two side parts (4), and a casement (5), and where the casement (5) is hinged suspended in the frame (1), preferably in the side parts (4) of the frame, by two complete swinging arm assemblies (6) articulately arranged on the casement (5), and where each one of the swinging arm assemblies (6) comprises an outer assembly arm (7), an upper swinging arm (8) and a lower swinging arm (9), and further one in the frame (1) fixed arranged frame plate (10), in which the swinging arms (8, 9) are articulately attached, and the locking device is arranged at the at least one swinging arm assembly (6), and the locking device is arranged to make the opening of said casement (5) more difficult, beyond a partly open position, a blocking position, and the locking device comprises at least one blocking element (11) and at least one holding element (12), and the blocking element (11) is arranged to prevent the movement of the casement (5) beyond the blocking position, by that the blocking element (11) in the blocking position meshes with the holding element (12), **characterized in that** the blocking element (11) is articulately attached to the swinging arm assembly (6) via a first link (13), and that the locking device also comprises an actuator (14), with which the blocking device is actuated, by that the actuator (14) is linked to the blocking element (11), via a articulated attachment, a second link (15), which link (15) is arranged between the first end (16) of the actuator and the blocking element (11), and further the actuator (14) comprises a second end (17), which is displaceable in at least two directions, and between the first end (16) and the second end (17) the actuator (14) is articulately attached to the swinging arm assembly (6), via a third link (18), and the dis-

engagement of the blocking function of the locking device is made by that the second end (17) of the actuator is, in a first step, arranged to be displaced in one direction, and is then, in a second step, arranged to be displaced in another direction relative to the first direction, whereby the movement of the actuator (14), by the interlinking with the blocking element (11), via the second link (15), influences the blocking element (11) and with that the blocking element (11) is made free from the holding element (12) and the blocking function is interrupted.

15. Locking device according to claim 14, **characterized in that** the actuator (14) is resilient clamped to the swinging arm assembly (6), preferable by an upsetting of the actuator (14), where the upsetting is provided between the articulated attachment of the actuator (14) to the swinging arm assembly (6) and the second end (17), whereby at least the second end (17) of the actuator has a distance to that part of the swinging arm assembly (6), in which the actuator (14) is articulated attached via the third link (18), and by that the second end (17) is displaceable towards that part of the swinging arm assembly, by the resilience/elasticity in the material.

16. Locking device according to any of the claims 14-15, **characterized in that** the blocking element also comprises a locking washer (19), provided on the swinging arm assembly (6), and where the locking washer (19), according to the position, is coordinated with the second end (17) of the actuator, at the blocking position of the locking device, and that the locking washer (19) comprises an plane part (21) which has a distance to the part of the swinging arm assembly (6) on which the locking washer (19) is provided, and in addition the locking washer (19) comprises a front edge (22) comprising a front wall (23), and a lower edge (24) comprising a lower wall (25), and one in relation to the front edge opposite open rear edge (27), and an open top edge (26), and the second end (17) of the actuator (14) can be inserted between the plane part (21) of the locking washer and the swinging arm assembly (6) through the top and rear edges (26, 27) of the locking washer, to a lock space (28) between the locking washer (19) and the swinging arm assembly (6), and the second end (17) of the actuator is arranged to be displaced, first towards the swinging arm assembly (6) and then to be fitted in between the swinging arm assembly (6) and the locking washer (19), in the lock space (28), and the movement of the actuator (14) along the swinging arm assembly (6) is prevented by the locking washer (19), by one at the rear edge (27) arranged locking lug (20), which prevents a backwards movement of the actuator (14) in direction along the swinging arm assembly (6), when the second end (17) of the actuator, in the blocking position,

is fitted in between the front wall (23) and the locking lug (20) and is resilient clamped between the locking washer (19) and the swinging arm assembly (6), and with that the second end (17) of the actuator is locked in the blocking position for a movement in direction along the swinging arm assembly (6).

17. Locking device according to claim 16, **characterized in that** the locking lug (20) has a wedge-shape with a tip (29), at the rear edge (27) of the locking washer, for guiding the second end (17) of the actuator towards the lock space (28), and additionally the locking lug (20) comprises one in relation to the tip (29), opposite stop edge (30), provided for blocking the movement of the actuator (14), whereby an disengagement of the blocking function of the locking device is prevented.

18. Locking device according to claim 17, **characterizes in that** the stop edge (30) of the locking lug has an angle relative the plane part (21) of the locking washer, which angle exceeds 90 °.

19. Locking device according to any of claims 16-18, **characterized in that** the plane part (21) of the locking washer has a guiding lug (32), provided on the outside of the plane part (21) of the locking washer, i.e. on the opposite side of the plane part (21) of the locking washer relative the lock space (28).

20. Locking device according to any of claims 16-19, **characterized in that** the second end (17) of the actuator (14), at least in the blocking position, is moveable provided in a first direction, preferable perpendicular relative the plane part (21) of the locking washer, towards the part of the swinging arm assembly (6) on which the stop locking washer (19) is provided, for disengage the engagement of the actuator (14) with the locking lug (20) and by that the actuation of the blocking element (11) is made possible, by a movement of the actuator (14) in a second direction, towards the open rear edge (27) of the locking washer (19), and by that the blocking function can be disengaged.

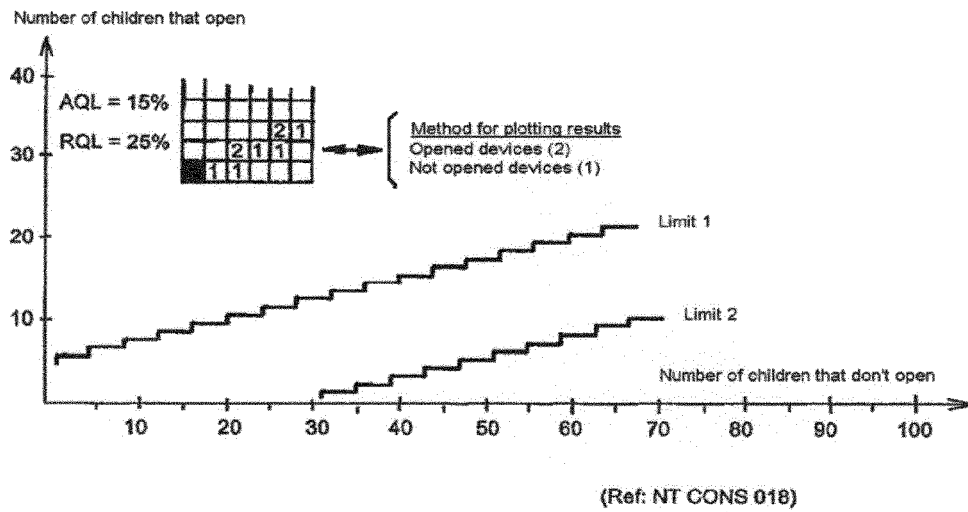


Fig. 1

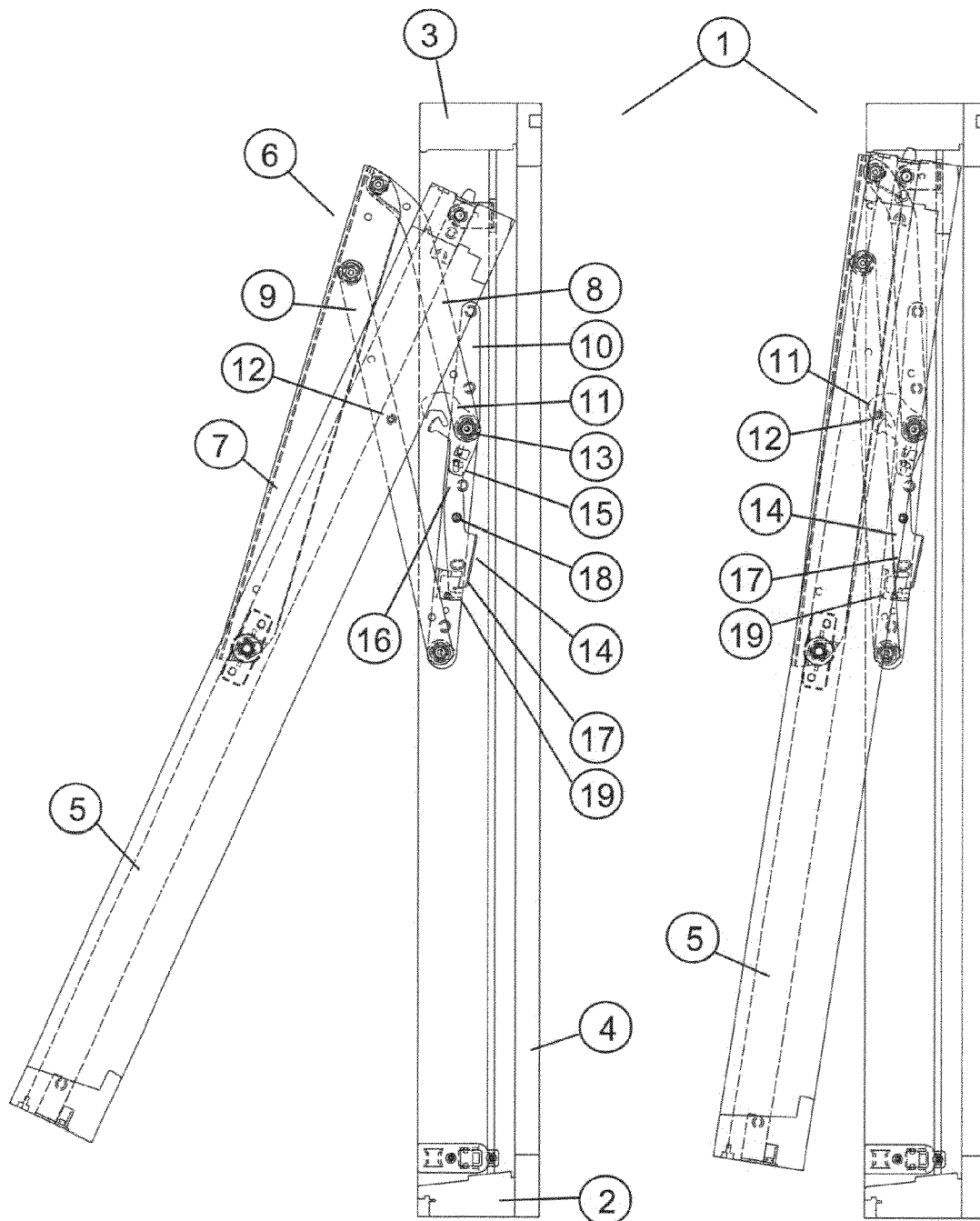


Fig. 2a

Fig. 2b

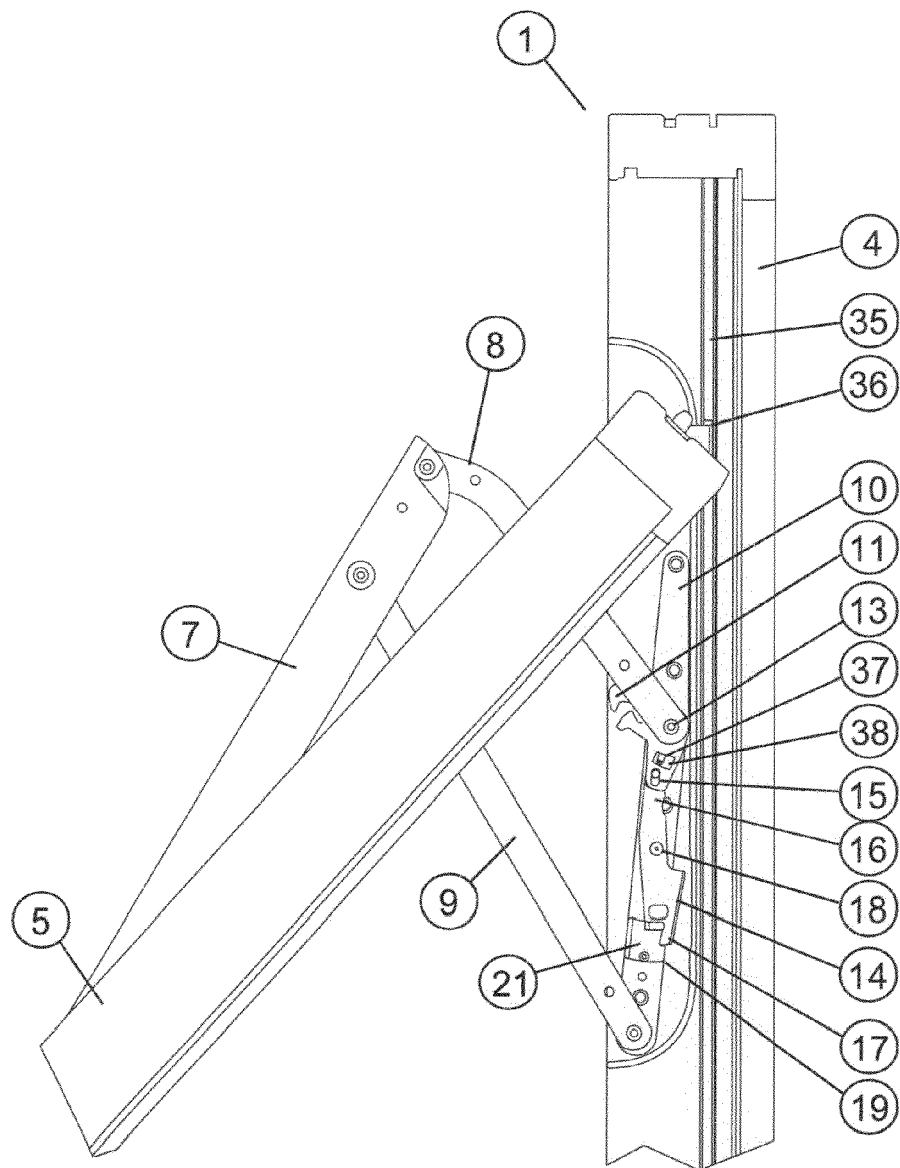


Fig. 3

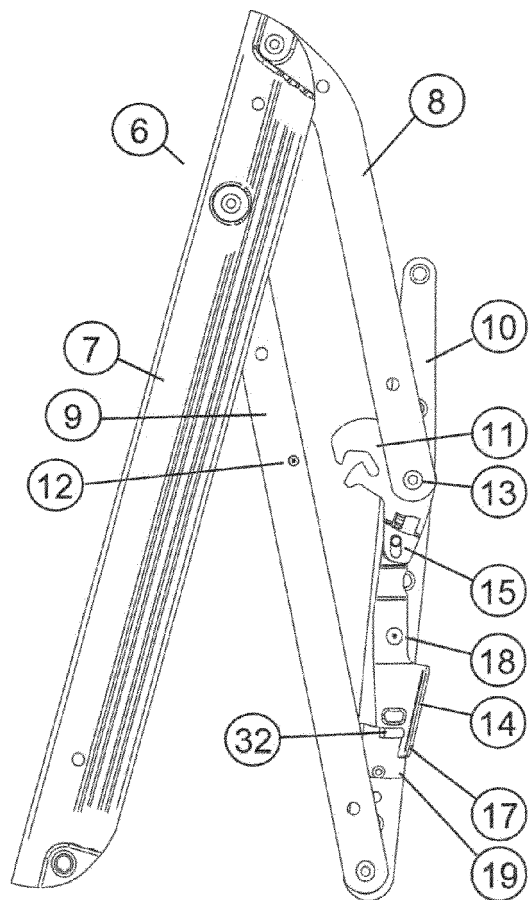
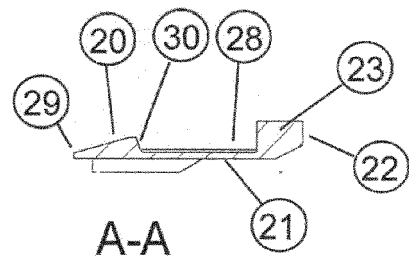
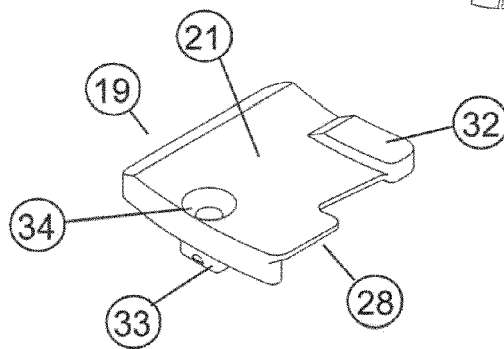


Fig. 4a



A-A

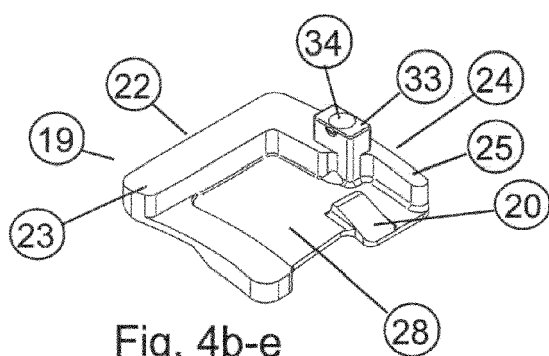
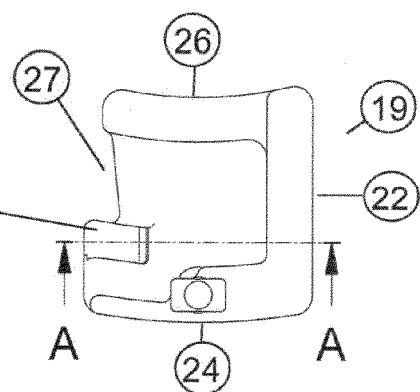


Fig. 4b-e



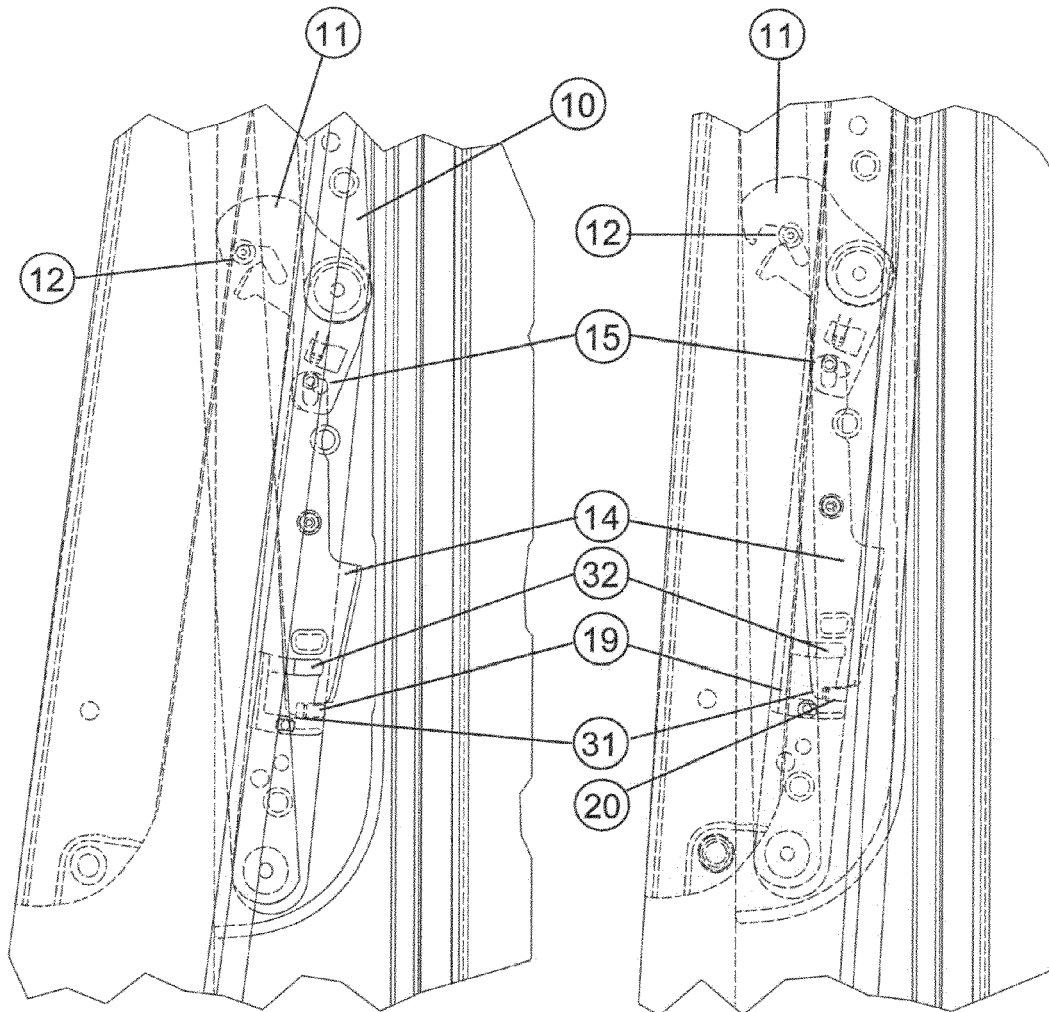


Fig. 5a

Fig. 5b

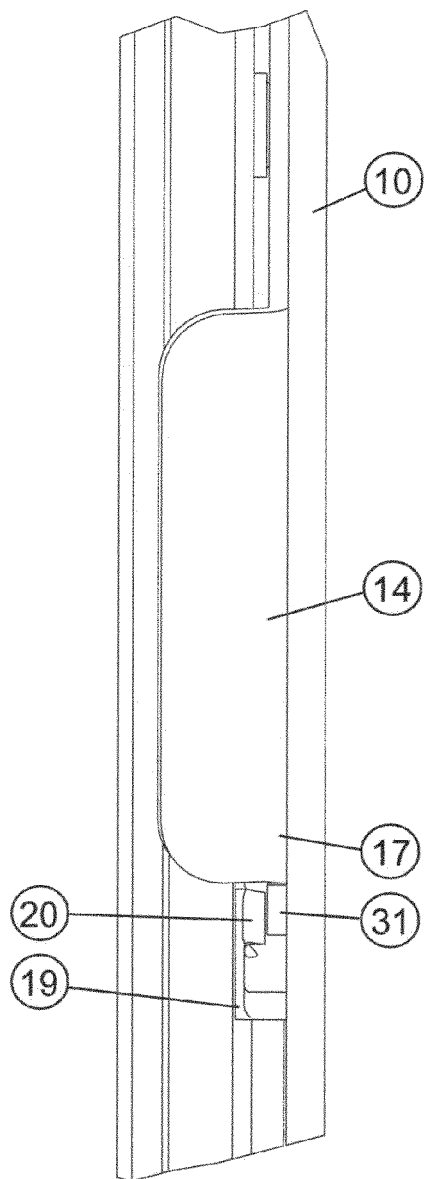


Fig. 6a

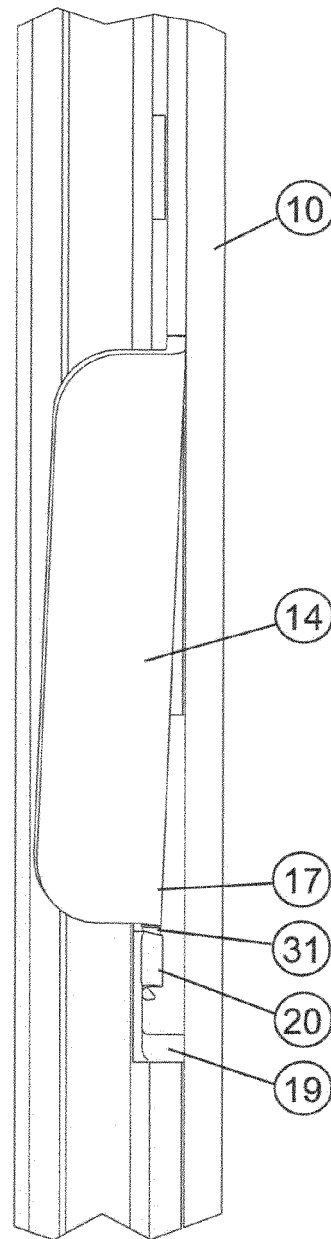


Fig. 6b

REFERENCES CITED IN THE DESCRIPTION

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