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(54) **Kompakt futókocsi egy párhuzamosan leállított, biztosított helyzetű ajtószárnyhoz**

Carriage for a door leaf for longitudinal movement of the leaf in a parallel displaced position

The invention relates to a carriage for a leaf for longitudinal movement of the leaf in a parallel displaced position according to the preamble of claim 1.

The leaf is moved from the displaced position into a non displaced, likewise parallel position in order to close the window or the door. The leaf moves supported by at least two carriages, which each have at least two castors and displaceably support the leaf during movement thereof.

The claimed invention proposes some significant improvements over known carriages in that the claimed carriages have a smaller height and have a greater bearing weight for even taller and even heavier leaves. Weights of up to 200 kg can be supported with the twin design and up to 160 kg with the standard design. The rollers are large enough, based on the housing in which they are received, to achieve a smooth running property. They are covered and the entire carriage is able to operate, in spite of its compact design, with a substantial extension path of up to 125 mm for the leaf (in the parallel displaced position).

Prior art solutions can be found, in particular, in DE A 32 34 677 and the assocciated EP B 103 725, in which two carriages comprising swing out arms move a leaf in the parallel displaced position, the employed position of the swing out arm being shown in that case in Fig. 4 and 5. The swing out arm is bent and the control arm, denoted by 19, is straight. The carriage itself has a leading control portion, denoted by 23, and can be locked in the closed position by a spring loaded locking member 39 which engages with the swing-out arm.

Another solution is EP B 201 717, which operates with two elongate, straight swing out arms in accordance with Fig. 5 of said document. These two arms are pivotably arranged on a carriage and are interconnected by a coupling rod, denoted by 25. They also have the control portion in Fig. 3, denoted by 21, 22, 23, protruding forwards from a carriage, and a locked position of a guiding joint 21 on the control arm 19 is actuated by a seat above the running rail, in which the downwardly projecting guide pin 21 engages; see the first mentioned document of GU, Fig. 4 with the protrusion 23 for control, the downwardly projecting guide pin 21 and the seat 32 which is arranged in a support mounted on the door or window frame and is designed in such a way that the free end of the control arm comes to rest there at the moment when the lower end of the locking pin contacts an edge of the release gap or slit denoted by 32. The emergence of the locking member 21 as a pin in this case which protrudes downwards enables the relative pivoting of the lower swing out arm and the pivoting back of the leaf against the fixed frame (door or window frame), see column 7, line 46 to column 8, line 23 of this document.

Insofar as in that case, and in this case also, the leaf is not only held, guided and moved by carriages on the lower edge, but movable shear members for guiding the leaf are also provided on the upper end of the leaf, reference is not to be made to this specifically, but rather the emphasis of the invention claimed here is to be placed on the lower region of a leaf, and in particular the geometry and design of the carriage(s) are to be improved compared to the prior art, as described above.

EP B 619 410, in particular figure 1, also operates with a leading control portion on the carriage housing. Two swing out arms are arranged pivotably on the carriage, which comprises a plate shaped projection 5 functioning as a control portion in which a single pin, which protrudes exclusively downwards, is guided by means of a slit 4. Both arms are straight and elongate; neither of them is curved. The opening path which the leaf can achieve between a closed position and an open position by pivoting out the main swing out arm is explained in Fig. 3 of the document. The main swing out arm 10 is shown, in that instance, in the pivoted out position The other swing out arm abuts a spring link which is located on the main swing out arm and holds the pin in a fixed or locked position in a bent end portion of the slit 5.

A problem of the claimed invention lies in making the carriage compact and efficient at the same time. The efficiency relates to the possibility of withstanding high force and therefore heavy leaf weights, of guiding and securing in the parallel displaced position and simultaneously adopting a size which is not excessively large and which, in the closed position, can also fit narrowly and neatly into a low structural region beneath the leaf and

can be moved on the running rail. The opening path, i.e. the ability of the carriage to securely distance a leaf from the fixed frame, is to be large.

The claimed carriage (claim 1) moves the leaf (which is not claimed) in a parallel displaced position which is secured by a spring element. It is compact in design. The rollers which move it are to be relatively large compared to the housing area, i.e. take up at least 90 % to 95 % of the overall height of the housing area. The rollers are preferably not accessible from above and the housing area is closed on the upper side in order to cover the castors from above.

The castors are arranged in a housing area. This comprises a bearing point, via which the swing out arm is mounted pivotably on the housing area. The swing out arm is the main arm which takes up the load of the leaf and holds said leaf in the parallel displaced position spaced over the large opening path relative to the fixed frame (as a window or door frame). For this purpose the swing out arm comprises a remote bearing point, via which the leaf is held and supported. A bearing point arranged closer to the bearing point on the housing area is provided for the end of a control arm which controls the movement of the swing out arm. The aforementioned control arm also has a further end region, guided in a control portion, which continues to extend in the longitudinal direction from the housing area. This control portion has a guide which guides the aforementioned "further" end region of the control arm and defines a specific course of movement of the arms.

To summarize briefly, two pivotable arms (as guides) and a housing area are described, wherein a control portion controls the movement of the arms relative to the housing. If, in this regard, a "closed position" (position S) and an open position (position O) are mentioned, these mean the pivoted position of the swing out arm arranged on the housing and the stored pivot position of the swing out arm defining the large opening path and the parallel displaced position of the leaf. The closed position of the leaf and the open position of the leaf are also intended indirectly, but in this case based on the corresponding positions and pivot positions of the arms of the carriage, which is claimed without leaves.

In this case, too, it should be mentioned that the shear guides and a plurality of shear assemblies on the upper face of the leaf do not require any specific explanation since they are of conventional construction and can be found in the prior art. The emphasis here lies with the claimed carriage and the design of the carriage.

The swing out arm can be formed in such a way that it enables the control arm to be covered completely. This is described with reference to a pivot plane. The pivot plane is parallel to a horizontal plane and lies beneath an upper face and above a lower face of the swing out arm. The bulk of the swing out arm is formed such that it can define surfaces above and below, these surfaces being considered as planes in horizontal extension.

If the two planes (upper and lower) are distanced parallel from the pivot plane, which is defined by the movement of the control arm, the pivot arm is not visible "from the outside", i.e. viewed from the outer face of the swing out arm. In particular, it is completely covered in the closed position and is not hinged and moved above an upper face of the swing out arm or below a lower face of the swing-out arm.

The arrangements of the prior art generally operate with two planar guides which are hinged to one another, neither of which is bulky and can cover the other guide from a viewing side, see EP-A2 1 959 080, figure 3a and figure 4. The viewing direction from the outside is described in such a way that it is the side of the swing out arm arranged opposite the control guide.

In the assembled position of the carriage, this is generally shown inside the compartment so that the term "outside" is not confused with the exterior of the assembly location, but merely provides the reference to the carriage, which is regarded as internal, and the view from the outside is the view onto the rear face of the swing out arm bearing the leaf.

In a further alternative, in particular combined with the first mentioned alternative, a closed position is described. This position S, as described above, is one configuration of the swing out arm. This swing out arm

comprises a slit portion (gap portion) which is formed in such a way that the control arm can be largely received therein, at least over portions. This relates to the closed position.
In the open position, the control guide is pivoted out of this slit or gap.
The slit/gap clearly extends in the longitudinal direction of the swing out arm and points towards the housing area of the carriage. The slit/gap allows the control arm to be received, improves the covering of the control arm and additionally provides safety positions or safety devices because the control arm cannot escape upwardly in the closed position. A lifting lock or a safety device against lifting is thus promoted.
The slit or gap is arranged at a distance from the upper face and at a distance from the lower face of the bulky swing out arm. It is not excessively prominent in the vertical direction so as not to attenuate the bearing force of the swing out arm over a measure necessary for the insertion of the control arm.
In a preferable embodiment toe slit or gap is provided with a limited depth. Thereby the stiffness and, as a result thereof, a high bearing capacity of the swing out arm can achieved, especially for weights such as mentioned in the beginning of the description.
An additional locking against upward escape movements (in the vertical direction, perpendicular to the horizontal plane described) is ensured by an upwardly closed control block which has an entry opening and, on the upper face above, a closed wall or surface which achieves this effect by means of an upwardly projecting protrusion, preferably as a stud (end of claim 6).
In an opening position (position "O" relates to the swing out arm, which is pivoted away), the guiding of the control arm with the curved or bent end region is achieved from the bottom, and the release of this end region is achieved from the top.
For this purpose, the upwardly projecting protrusion and the downwardly projecting protrusion are used within the meaning of a double protrusion which extends upwards and downwards from the previously described pivot plane of the control arm. This protrusion can preferably be formed as a stud, more preferably with a sleeve shaped casing for the reduction of friction during guiding and release motions.
The downwards guidance is assumed by the control portion, which continues from the housing area in the longitudinal direction thereof and comprises a guide, in particular in the form of a deep groove. The downwardly projecting protrusion engages in this groove and is guided thereby. The upwardly projecting protrusion is controlled. in particular, a release is to be understood by the control, with which this protrusion and with it the bearing curved end region and the entire control arm are disengaged or released.
The disengagement or release is based on a releasably locked position which is achieved by an angled portion of the guide groove with reference to the downwardly projecting protrusion. This position O is the extended position for the parallel displacing movement of the leaf and keeps constant the pivot position of the swing out arm via the control guide, which is locked in the angled portion of the guide groove via the downwardly projecting protrusion.
In order to leave this open position and again move the leaf towards the window or door frame, the control arm is released upwardly via the upwardly projecting protrusion and for this purpose a control block may preferably be used, into which the control portion enters and which has a path like entry as a downwardly open, slot like recess which detects the downwardly projecting protrusion upon entry and allows it to move relative to the control portion.
Once the downwardly projecting protrusion has been disengaged or released, it can be moved back along the guide in the longitudinal direction so as to allow the swing out arm to be employed, controlled via the control arm.
The aforementioned feature differs in terms of guidance and control. Guidance is carried out downwardly or in the lower region below the control arm by the downwardly projecting protrusion of the double protrusion. The upwardly projecting protrusion of the double protrusion is entrusted with a control effect which relates, in par-

ticular, to the control of the guide out of an angled end portion and therefore results in the disengagement or release from the O position.

The design of the guide is described in greater detail in a further alternative. In order to enable guidance within the meaning of a displaceable guidance in the longitudinal direction with reference to the downwardly projecting protrusion, the guide is formed as a guide groove which is open upwardly. The guide groove itself has a non continuous base, i.e. is not completely open downwardly, but is closed in portions. However, this downwards closure of the groove is not complete, but is formed only in sections so as to allow through holes through which any infiltrating particles of dirt can fall downwards.

This falling out can also be encouraged in that the downwardly projecting protrusion engaging from above in the guide groove intercepts the particles of dirt and feeds them to one of the other openings in the base, from where they fall from the guide groove, preferably at the respective end of the guide groove. This type of self cleaning is associated with a stiffening of the control portion which carries the guide groove.

The control portion, which projects in the longitudinal direction of the housing and continues in this direction, consists not only of a peripheral wall, of which the rigidity may not be sufficient, but is braced on the base side by cross struts which may be considered as preferably planar connections, but also as partial bases.

The base is preferably open via through holes in the respective end region of the guide groove.

Cut in the transverse direction, a U shaped profile is provided, at least at some points over the longitudinal direction of the control portion.

The rigidity and reliability of the guidance of the control portion can thus be improved. This is also possible if the control portion is forward or upstream, and cannot be braced laterally, from above or from below by other housing portions.

A further embodiment relates to the design of the control portion for controlling the control arm. A control block is added for further control and is arranged separately at the end of the path of travel on the profiled carriage rail. The function of the feature is based on the locked position of the control arm, i.e. a position in which the end of the control arm is locked in at one end of the guide of the control portion.

The locking is a releasable locking and the release takes place by removal from one end of the guide, this end being an angled end as an end region, relative to the longitudinal extension of the main components of the guide in the form of a guide groove.

The control portion is slender and designed so as to be leading, in such a way that it can engage at the end of the path of travel of the carriage in a transverse through-opening in the control block. It engages not only in, but also through this transverse (laterally open) through-opening.

In a lateral end section of the process of penetration of this slender, lug shaped control portion, the control block begins to act from above. It is designed in such a way that, acting from above, it allows the control arm to be removed from its locked position, more specifically removing it from the angled end region of the guide in a controlled manner.

The development for controlled removal is preferably designed as a path like entry which is open towards the side, extends in an inclined manner and is closed upwardly by a wall, which wall may involve the entire upper face of the control block.

A bulky design of the swing-out arm is preferred. A bulky design is a physically thick, strong design which is not a plate like shaping of a guide, but is a design as a bulky arm considerably thicker than the relatively flat control guide reminiscent of a plate shape, but which can additionally be reinforced by stampings which extend in the vertical direction and are oriented in the longitudinal direction. Even with this reinforcement, however, the guide remains a plate shaped guide in contrast to the bulky swing-out arm. The swing-out arm is straight, at least in the position O, i.e. in the pivoted out position (location or "position"). In the bearing region it has an offset, although this cannot be seen in the open position and remains inside the housing area. By contrast, the

control arm has a straight portion and a curved portion, said curved portion being oriented towards the control portion. It is thus possible to cover the control arm, to apply a high load and still achieve a compact design of the carriage comprising swing out arms.

In a yet further alternative which can also be considered in combination with one or more of the aforementioned features, the double stud is described in detail and is arranged at the end region of the control guide, which end region is the "other" end region associated with the guide of the control portion, according to the third dash of claim 1.

The double stud projects upwardly and downwardly as a protrusion, the lower protrusion being provided for guiding and the upper protrusion being provided for release from the locked position. The locked position is the position O with the parallel displaced leaf.

The difference of the bidirectional double stud is clearly acknowledged. From above it is released (from the control block) and from below or "downwards" it is guided (in the control portion). In the assembly region of the double stud, which is mounted on the end region preferably in the form of the curved portion of the control guide, a peripheral collar is produced which projects beyond the dimensions of the control stud in the radial direction. This collar will be described in greater detail for other securing purposes.

A releasably locked position is achieved by the downwardly projecting protrusion in an angled end region of the guide. This position can be secured, for which purpose a spring element is used which exerts pressure or force in a horizontal direction. This force is exerted over a lateral plate protrusion onto the curved portion as the front end region thereof. The force acts, at least in part, in the direction of the angled path portion.

The spring element itself can be replaceable. For this purpose it is provided functionally with a retaining portion, which is straight, and then preferably extends in a semi-circle so as to be received in a compartment which may have an undercut so as to position the free end of the end of the retaining portion of the spring element in a locking manner. The compartment may be open upwardly so as to release this locking of the spring so that it can be replaced.

The portion of this spring element exerting the pressure is preferably curved so as to have a curve oriented outwardly towards the bent end portion of the control guide.

In addition to the spring force and its securing effect, an overlapping portion of the housing area may also be provided which overlaps the lateral plate protrusion of the curved control portion.

This overlap may be present in the locked position and is also present whilst the control arm is removed, in a controlled manner, from the control block out of the locked position via the upwardly projecting pin and is received, in its holding effect, by the control block and its path-like entry.

The transition of the locked position on the control portion towards the control block on the window or door frame is secured by the overlapping portion. A release or falling out upwardly is thus effectively prevented.

The upwardly arranged spring piece which is displaceable in the transverse direction is provided at another point of the housing area in an end portion.

This spring piece is plate-shaped, at least over portions, and preferably has two locking positions. One lying further outwardly and one lying further inwardly.

The spring piece supports the latched position of the carriage in the inserted position in the profiled carriage rail.

The carriage is initially tilted and inserted into the carriage rail by an inwardly moving rotation in the sense of an insertion/tilting movement, guided on the carriage castors, which form the momentary pivot point. For this purpose the carriage has a minimum distance from an upper, overlapping portion of the carriage rail in order to carry out this pivoting motion. A securing protrusion from the housing area engages beneath this overlapping portion, which is necessary, however, in order to pivot into this gap.

In the inserted state, the gap left free for this purpose is bothersome. It is reduced in size in that the spring is inserted and at least reduces the gap in terms of height.

The displacement may lie from one locking position of the spring piece in a further locking position, lying further inwardly (towards the carriage rail), of the same spring piece.

If the carriage is to be removed again, the spring is displaced back outwardly in order to pivot out and remove the carriage from the carriage rail via an opposed tilting movement.

The swing-out arm can be contacted tightly against the housing area in its pivoted-in position as position S. A convex curvature in a side region of the control portion, which is angled to the longitudinal guide, is received in a bay-shaped recess in the swing-out arm.

The carriage is defined by two arms and a housing area, supplemented by a control portion. The control portion controls the control arm and receives a downwardly projecting protrusion for displaceable longitudinal guidance. The upwardly projecting protrusion is actuated by a control block, i.e. controlled, more specifically at the end of a path of travel of the carriage. Whilst the control portion engages in a seat in the control block, the upwardly projecting protrusion engages at the end of this first engagement in a path-like entry of the control block extending in an inclined manner and moves the curved/bent portion of the control arm and thus the entire control arm out of the retracted position.

This removal occurs by a reverse control from above and a guidance from below. So that the control portion can be retracted into the control block and said control block is not too bulky, the control portion is described as being slender and lug-like. Accordingly, a very long lug is intended, which is slender in cross-section compared to its length. The control block itself is to be mounted on the window or door frame in the running rail on the side pointing into the room and stands in the longitudinal direction in the path of travel of the carriage, or rather the housing area thereof. It is arranged above the guidance path for the castors and forms the end of the path of travel of the carriage with the position O of the swing-out arm. It guides the control arm out of the retracted position via the upwardly projecting protrusion, such that the carriage can move back in the opposite direction on the castors, the protrusion is reliably received and remains in the path-like entry in the control block, and the swing-out arm, controlled by the control arm, is moved back into the position S. The leaf approaches the window or door frame and the closed position. Owing to the design of the bulky swing-out arm, the bearing capability can be ensured, with simultaneous covering of the visible side, when the slit receives part, a substantial portion per se of the control arm, and the slit does not penetrate completely through the swing-out arm in a transverse direction, but extends in the direction of depth only to a limited extent.

Preferred embodiments of the protrusions are stud pieces. The control block is preferably closed on the upper face by a wall having an upper face.

The claimed invention will be described and elaborated hereinafter on the basis of a number of exemplary embodiments.

Fig. 1 is an oblique view of a carriage comprising a housing area 10 and a swing-out arm 30 in a closed position (position S), with the swing-out arm 30 arranged adjacently and not pivoted out.

Fig. 2 is the same carriage of Fig. 1 in an open position (position O), with the swing-out arm 30 pivoted out, a control arm 35 articulated thereto, a control portion 40 guiding the control arm 35, and the housing area 10.

Fig. 2a is an enlarged view of the detail of region A of Fig. 2.

Fig. 2b is a view from above onto said region A in the axial direction of a protrusion 39a as a projecting pin.

Fig. 3 is a view corresponding to Fig. 1 with the support location 100 for the leaf (not shown), a groove 41 in the control portion 40 with a straight portion 41a and an angled locking portion 41b being explained in greater detail.

Fig. 4a,

Fig. 4b are an oblique view and a view from the front of the right-hand end of the housing portion from Fig. 3, an opening 19 for a coupling rod to a further carriage being visible. A spring element 60 is visible from above locked in a first position.

Fig. 5a,

Fig. 5b are an oblique view and a view from the front of the same end as that of Fig. 4a, 4b, but merely with another locking position of the spring 60.

Fig. 6a is an oblique view of the carriage from the visible side (from the outside) of the swing-out arm 30 in the closed position of the arm 30.

Fig. 6b is the same view with a pivoted out swing out arm 30, the control guide 35 also being visible, as is the engagement of the upwardly projecting protrusion 39a in a recess in a control block 50. The carriage rail is visible as a profiled rail 70, on which the carriage can be moved in the longitudinal direction via castors.

Fig. 7a,

Fig. 7b are two views of the control block 50 with different openings or recesses 51, 52 and 53.

Fig. 8 is an open position of the carriage with a pivoted swing-out arm 30, visible control arm 35 and the two aforementioned castors 20, 21, which are covered from the opposite side but are free from beneath for placement on the path 75 of the carriage rail 70.

Fig. 9 is a view from below of Fig. 8, the side view from the outer face of the carriage onto the swing-out arm 30 and the height thereof compared to the height of the housing portion 10 being visible.

Fig. 10 is an enlarged view of the detail of the guide groove 41 as a guide in the control portion 40, the latter comprising a convexly curved side region 42.

Fig. 11 is an oblique view from above, illustrating the guide groove 41 and the engagement of a downwardly projecting protrusion 39. The guide groove 41 is arranged along the control portion 40.

Fig. 12 is a further detail with a viewing direction from above onto the upper protrusion of the double pin 39, the right-hand end portion of the guide path 41 with base-side through-holes, as can be seen in Fig. 10, being illustrated. A spring 14 and an overlapping securing portion 15 can also be seen and act on a collar of the end region 35b of the control arm 35.

Fig. 1 shows an oblique view of a carriage from a viewing direction oriented towards the inner side. The housing area 10 can be seen and to the right thereof an end region, on which a spring element, which is formed in a plate-like manner at least in portions, is displaceably mounted. The arm region comprising the main arm 30 as a swing-out arm and the control arm 35 can also be seen, as can a control portion 40. Bearings 12, 11 can be seen, in each of which a shaft of a respective castor for the housing area is mounted. The geometrical axis is 20a for the bearing 12 and the associated castor 20 can be seen in Fig. 8. The castor 21 is arranged at a distance on the housing area 10 and on the other side of the main bearing 16 for the swing-out arm 30. This bearing 11 rotatably supports a shaft 21', of which the geometrical axis is 21a and of which the castor 21a is also visible in Fig. 8 from below.

The housing area 10 is closed at the top, above the castors, in such a way that these are covered from above and are protected against infiltrating dirt. The castors themselves have a large diameter, which can be seen in Fig. 9 in the case of the castor 21 in a cut-away region. The castor takes up practically the entire height H of the housing portion, reduced by the upper covering wall 10a of the housing area.

The size of the castors is at least 90 % of the overall height of the housing area. The overall height of the housing area can be seen in Fig. 9 as H_{10}. A carriage which can move along the leaf is formed by the housing 10, the castors, the described arms and the control region. The leaf may be moved into a parallel displaced position via

a tilted position, for which purpose control arms (not described in greater detail here) are arranged on the upper edge of the leaf and are also displaceable. The leaf can also just be stored in parallel, without an intermediate tilting position. The leaf is displaced via the carriage in the parallel displaced position.

Two carriages may be provided which are spaced apart and carry the leaf at the lower edge in a displaceable manner. The leaf is articulated rotatably on the swing-out arm 30, for which purpose the recess there serves as a bearing 100 with its geometrical axis 100a. A stud arranged on the leaf engages in this recess as a bearing and couples the leaf to the swing-out arm 30.

The spaced carriages may both be formed identically, but may also be formed differently in that only one carriage uses a control portion and the other carriage has no such control portion 40.

The two spaced carriages, each with their two castors according to Fig. 8, are otherwise formed identically. They are coupled via a coupling rod Ks (or 19) which is inserted into a recess 19', as illustrated in Fig. 8. This coupling rod is fastened on each carriage in a hole 19a via a mounting screw 19b. The hole has a geometric axis 19a' which extends perpendicular to the direction of extension of the coupling rod (not shown in the figures). The coupling rod is preferably round, and the spacing thereof is adapted to the horizontal dimension of the leaf in such a way that the two carriages can support the leaf and lie in the position S of the carriages beneath the lower edge of the leaf, but can protrude therefrom in the horizontal direction.

The structural dimension beneath the leaf is small, preferably less than 40 mm, in particular substantially in the range of 35 mm. The weight of the leaf defines the necessary load which is taken up by the swing-out arm 30 or, in the case of two carriages, the swing-out arms 30 and which must be transferred to the housing 10. If leaves become increasingly thicker owing to the demands of thermal insulation, they become heavier. If leaves become increasingly taller owing to aesthetic factors, they also become heavier. Greater breadths of extension are required for thicker leaves and therefore the swing-out arm 30 is to be formed accordingly, ensuring at the same time that increasingly greater loads caused by the geometric dimensions (height thickness) of modern leaves can be taken up.

According to Fig. 8, the castors 20, 21, which are rotatably supported via their shafts 21', 20' in the side walls of the housing 10, support the carriage and run on a running track which is provided by a profiled carriage rail 70 which can be mounted from beneath on the window or door frame.

Such a running track 75 can be seen in Fig. 4a and 5a. The carriage rail 70 is mounted on the window or door frame in the region of the lower, untoleranced dimension of the window or door frame. The dimension between the lower end of a leaf overlap (not shown) and the lower face of the window or door frame is of the same size as that described before of less than 40 mm. In spite of this highly reduced, untoleranced dimension, the castors are formed with a large diameter. The carriage and its housing area 10 fit in this untoleranced dimension, moving displaceably on the running track 75, and it is still possible to achieve an upper covering of the castors by the upper wall 10a of the housing.

A grip control via a handle which controls the shears held above in gliders is also not shown and is used for the total operation. These shears can be controlled in a forced manner via the handle, or the handle itself is used to move the leaf in a direction perpendicular to the plane of the window or door frame. The handle can also be used to displace the leaf in the parallel displaced position in the longitudinal direction, assisted movably by the castors on the carriage rail 70 with the running path 75 (also called a running track).

The position S (closed position) according to Fig. 1 is to be seen after the pivoting out of the swing-out arm 30 as the position O (open position) in Fig. 2. The guide pin 39, which comprises an upper protrusion 39a and a lower protrusion 39b, has arrived at the opposite end (right-hand side) of the path guide (in the form of a guide groove) 41, where it is releasably locked in an angled path portion 41b, for which purpose the lower protrusion 39b preferably serves as a stud. This stud 39b is arranged in the position S of Fig. 1 on the left end of the guide groove 41 of the control portion 40.

This path guide is shown more clearly in Fig. 3, which corresponds to Fig. 1, and explains the path guide of the control portion 40 in greater detail. The control portion 40 has a groove 41 formed from a straight portion 41a and a locking-in portion 41b extending at an angle to the left thereof. This locking-in portion defines the position O of Fig. 2. The end of the straight path portion 41a defines the position S according to Fig. 1 and 3.

As illustrated in Fig. 2 or Fig. 8, the control guide 35 is angled or bent, i.e. is not completely straight. It has a longer straight portion and a front end portion extending therefrom in an angled/bent manner which carries the double protrusion 39 extending upwards and downwards in either direction. Said protrusion 39 is arranged on the front end portion in such a way that a peripheral collar is formed in the thickness of the plate material of the control guide 35 and extends over the control portion 40 and the upper face thereof, whereas the downwardly projecting protrusion 39b is guided in the path 41b, 41a.

The guide 35 is supported rotatably at its other end via an axis 37 in a bearing of the swing-out arm 30. The bearing opening 38 and the axis 37 have the same geometric axis 37a.

The bearing of the control guide 35 via the bearing point 37/38 on the swing-out arm 30 and the pivotal bearing of the swing-out arm 30 via the bearing point 36/16 with the geometric axis 36a on the housing area 10 enable the pivoting and the control of the pivoting, controlled by the control portion 40.

The straight portion of the control guide 35 is 35a, and the portion in front extending in a curved or angled manner is 35b.

The two positions O and S are shown from another viewing direction, looking from the outside onto the outer planar face 30' of the swing-out arm 30, in Fig. 6a and 6b. In Fig. 6a the angled end of the swing-out arm 30 can be seen, this not being visible from the outside in the position O. The arm acts in a straight and elongate manner. By contrast, the control guide 35 is angled, the angled region carrying the guide pin 39, of which the upper protrusion 39a cooperates in Fig. 6b with a control block 50 which has an upper wall which defines a closed surface 55 pointing upwardly. The control block is mounted on the carriage rail at one end of the path of travel of the carriage. It cooperates with the upwardly projecting protrusion 39a, as will be described below in greater detail. There is also cooperation between the collar of the curved portion 35b and a protruding lug 15 in accordance with Fig. 2a and 2b in the locked position of the downwardly projecting protrusion 39b in the angled portion 41b of the guide groove 41. This cooperation is likewise explained below in greater detail.

It can be seen from Fig. 6a, which is the other viewing direction of Fig. 3, that the swing-out arm 30 completely hides the control arm 35 from the viewing side (from the outside) onto the arm surface 30'. The control arm 35, as can be seen in Fig. 8, is not arranged above an upper face 30" and is not arranged below a lower face of the swing-out arm 30, but rather its pivot plane is formed in such a way that it comes to rest between these two faces (upper face, lower face), i.e. the front side 30' (viewed from the outside) reaches the cover of the control arm 35. For this purpose, the plate-shaped guide 35 is slender in the vertical direction compared to the bulky swing-out arm 30. The bulky design is also preferably adapted to be able to accommodate a gap or slit 31, as can be seen in the view of Fig. 2 onto the inner regions between the arm and the housing area 10. This slit/gap 31 is provided to receive the control arm 35 in the position S and is formed accordingly for this purpose. This slit 31 also lies in the pivot plane of the control arm 35, which is not illustrated separately, but can easily be imagined by a planar extension in the horizontal direction of the plate-shaped control arm.

Even if the control arm 35 bulges in a slightly reinforced manner in a centre region, it remains flat in a plate-shaped manner. The reinforcing bulge 35c is received by the slit/gap 31 via the control guide 35. The curved portion 35b projects out slightly from the gap itself in the closed position of Fig. 3 and the longitudinal portion 35a of the control guide 35 is almost completely received in the gap/slit 31 in the closed position S.

The slit/gap 31 extends in the longitudinal direction of the swing-out arm and does not pass through the bulk of the swing-out arm 30, but instead a maximum residual area of material remains on the visible side 30' so as to retain the rigidity of the swing-out arm 30. A U-shaped profile of the swing-out arm is thus obtained at a num-

ber of sectional planes in the longitudinal direction (section transverse to the longitudinal direction), with a relatively thick connecting branch and two webs, of which one is thicker in accordance with Fig. 2 and the other is narrower. The gap or slit thus lies in the centre between the upper face and lower face of the swing-out arm, but offset upwards slightly.

The slit or gap 31 can thus receive the control guide 35, at least in portions, in the closed position and can pivot it out for the position O. The control guide is received, at least in portions, in the position S, the straight portion being received almost completely and the curved portion 35b protruding out from the swing-out arm 30 in order to enable guidance of the control portion 40, even in the position S.

"At least in portions" could also be understood to mean that the control functions by the double protrusion 39, in particular formed as a double stud, in the guide groove 41 of the control portion 40 only have to be achieved in sections.

With regard to the general structure of the embodiment in terms of arm geometry, it can be said that there is a straight portion 35a and a curved portion 35b (in this case also often called a curved region) The swing-out arm, which is thicker in terms of bulk compared to the control arm 35, basically extends in a straight line, at least in the region which projects from the housing 10 in the position O according to Fig. 2. The geometry of the arms can also be seen in Fig. 8 in the view from below. The residual piece 34 according to Fig. 6a, which can be seen from the outside in the position S, is offset, but is hardly visible in the position O according to Fig. 6b from the viewing side (from the outside). In spite of this offset portion at the bearing point 36/16, i.e. at the bearing end of the swing-out arm 30, this is to be referred to as elongate and straight. Its bulky design was already explained in conjunction with the gap/slit 31.

The adaptation of these geometries makes it possible to have a slender, compact design, simultaneously to enable controls, and to appear virtually completely compact in the closed position, as can be seen very clearly in Fig. 6a.

The control, which has already been mentioned, takes place via a double protrusion 39 which has an upwardly projecting protrusion 39a and a downwardly projecting protrusion 39b. These two are preferably designed as studs, more preferably are provided with a rotatable sleeve so as to be guided more easily and so as to generate less friction when guided. The double protrusion, which can be seen from all views in Fig. 2, Fig. 6b and the enlarged detail views of Fig. 11 and 12, has two different functions or roles above and below with a substantially identical design. The double protrusion is arranged in the bent (curved) end region 35b of the control guide 35. It allows a collar to be provided around it as a plate-like collar, but does not therefore project completely as far as the outer edge of the control arm 35 in the region 35b thereof.

The downwardly projecting protrusion 39b is provided from below for guidance. The function and role of the upwardly projecting protrusion 39b is to provide a release from the locked position according to Fig. 2. The locked position is that for the parallel displacing of the leaf. The release is carried out from above. The release takes place as is achieved in Fig. 6b by inserting the upwardly projecting protrusion 39b into a lateral recess 51 in the control block 50. This control block 50 is explained in Fig. 7a and 7b from two oblique views. In this case the insertion of the upwardly projecting protrusion 39a is shown in the direction V_{39}, more specifically into one diagonal recess 51, it being possible for the control block 50 to comprise two of these, in order to be used for applications striking to the left and for applications striking to the right.

The control block 50 is mounted on the carriage rail 70The carriage with the housing 10 runs in Fig. 6b – when the arm 30 is opened –, from left to right, wherein it engages at the end of the path of travel with the leading (projecting away in a forwards direction) control portion 40 in a further recess 53, penetrating in a transverse direction, in the control block 50.

This further recess enables engagement in the direction V_{50} according to Fig. 7a, which may be more than merely an engagement, in particular also a reaching through, which can be seen by the empty nature of the front end of the control portion 40 in Fig. 6b.

The point at which the path-like entry 51 acts on the upwardly projecting protrusion 39a in a controlling manner lies in a temporal end section of this process of engagement, in particular of the reaching through the recess 53 which is provided so as to penetrate transversely in the control block 50.

The control by the inclined path 51 with a likewise inclined groove portion 41b of the guide groove 41 leads to a removal of the control guide 35 and of the downwardly projecting protrusion 39b from the angled groove portion 41b and results in the position O, as shown in Fig. 6b.

The carriage moves back, towards the lower left in Fig. 6b, and the swing-out arm 30 is pivoted in until it reaches the position according to Fig. 6a. Here, the housing 10 is considerably distanced from the control block 50, whilst it had arrived at this control block 50 from the locked position at the start of the removal acting from above. In the latter position, the control portion 40 engages through the control block 50.

It is helpful to the engagement through if the control portion 40 leads in a forwards direction. It is formed in a slender, lug-like manner, the control portion 40 still being reinforced, which is explained in greater detail on the basis of Fig. 10 to 12.

The guide groove 41 with its two portions 41a, 41b is provided in the slender lug-like control portion 40. The angled portion 41b is placed in a convexly curved side region 42 (bulge) according to Fig. 10, which in turn engages in a bay-shaped recess 33 in the position S of the swing-out arm 30. This engaged position of "bulge" 42 in bay 33, as can be seen in Fig. 2, is that of Fig. 6a.

It is thus possible to reach the position O for the parallel displacing by the angled portion 41b, and to still form the swing-out arm 30 so as to abut tightly against the housing 30 and adopt a virtually parallel position to the carriage rail 70, in the position S.

It can be seen that the bay-shaped recess 33 is arranged beneath the slit/gap 31 and as little material as possible is to be removed from the bulky swing-out arm 30 so as to retain its rigidity, but still to enable the closed position S to be as close as possible to the housing portion 10 and the carriage rail 70. It can also be seen from Fig. 2 that this bay-shaped recess 33 does not completely engage through to the lower face of the swing-out arm in the vertical direction, but instead the surface of the swing-out arm 30 is closed on three sides.

The guide groove 41 is also not completely closed from below, but has a base structure which is closed only in portions. In other words, the base is provided in portions, which can be seen from Fig. 10 and 12 and 8.

The shape of the path in the groove 41 can be seen in Fig. 10 in a view into the groove 41 from above; the portion 41a is the straight portion and the angled portion 41b extends at an angle of slightly less than 90° in a downwards direction. It thus forms a pocket-like recess for the locked position S of the downwardly projecting protrusion 39b.

Once the base of the groove 41 has been penetrated by the openings 41', 41" and 41*, the rigidity of the forwardly projecting control portion 40 increases with retention of the two base segments 44a, 44b in the example of Fig. 10. A U-shaped profile is provided in a number of sectional planes, perpendicular to the longitudinal extension, and ensures the rigidity of the slender, lug-like control portion 40.

Particles of dirt and other contaminants may fall through the base opening(s), which could impair path control. During longer periods of operation, it should not be ruled out that disruptive particles of dirt could infiltrate into the path 41, even with a design according to Fig. 6a which is largely covered from above. During motion of the downwardly projecting protrusion 39b, these particles of dirt are cleared, provided they were deposited on the base segments 44a, 44b used for reinforcement. The downwardly projecting protrusion 39b has a free evacuating effect in conjunction with the base openings 41', 41" and 41*.

The position O shown in Fig. 2 and 6b, as well as in Fig. 8, is not only secured by the angled portion 41b, but is held reliably by two further measures.

At the point in time shown in Fig. 6b, the protrusion 39a is reliably received by the control block 50 and its path-like entry 51. The further measure is structured and formed functionally as follows.

An overlapping portion 15, as can be seen in Fig. 2a and 2b in the enlarged detail views, overlaps the collar 35b', which surrounds the double protrusion 39 (and which is part of the bent portion 35b of the control arm 35). This overlapping of the lug-like protrusion 15 ensures a vertical movement out or a springing out of the protrusion 39b from the guide groove 41 and a vertical displacement of the control guide 35.

This overlapping is not only provided in the locked position of position O, but also with retraction according to Fig. 6b, and the transfer of the holding function of the angled portion 41b to the path-like entry 51 during the inwards movement v_{39} of the downwardly projecting protrusion 39b. The collar portion of the bent portion 35b of the control arm 35 moves further beneath the lug-like protrusion 15, loads a spring element 14 located below and which allows this movement, and arrives in the entry 51 of the path in the control block 50, where it is held securely, as this engagement region is closed upwardly as a result of the upwardly closed wall 55 of the control block 50. A falling out, a vertical movement out or a springing out is reliably prevented.

The aforementioned spring in the form of a spring element 14 can be seen more clearly in the view from above of Fig. 2b and in Fig. 2a. It has a curved region, portions of which can be seen in addition to the lug 15, but the main portion is arranged beneath the lug-like overlapping portion 15.

The spring element 14 continues in a holding portion 14b, 14c, which is U-shaped and can be seen through the top open window of the holding chamber 13 in Fig. 2b. The spring is inserted from below into an opening and latches via its free end 14c behind a protrusion in the holding chamber 13. It is thus fixed in position, but can also be replaced at the same time if the free end 14c is bent away from the protrusion using a tool and the spring element 14 is removed from below. A new, identically formed spring element 14 can then be inserted from below and fixed in place.

The securing point in the locked position according to Fig. 2 or Fig. 8 or Fig. 11 and 12 is additionally secured by the spring element 14. This exerts a compressive force onto the lateral plate protrusion 35b' in the form of a collar of the raised portion of the control arm 35 and presses it reliably into the locked position on the end of the angled portion 41b of the guide groove 41.

A portion of the bent spring back of the retaining spring 14 is arranged beneath the lug 15 and above an upper face of the control portion 40.

The pivoting in of a carriage into the carriage rail will be explained on the basis of Fig. 4a to 5b. The end portion of the carriage shown in this instance is that which is arranged to the right in Fig. 1 and 2. It is an end portion in which the connecting rod 19 is introduced, which is fixed via a threaded bore 19a (not shown) using a mounting screw. A spring piece 60 is provided above this fixing portion 19' for the connecting rod and comprises two locking position which will be described below.

The spring 60 can also be seen in Fig. 1, where it is in the position which can be seen in the oblique view of Fig. 4a and in the view from the front of Fig. 4b. It is a locked position which is achieved by a first groove 18a which is arranged above on the carriage end (on the housing of the carriage).

A second groove to the left is denoted by 18b and is arranged at a distance. There are therefore two spaced groove portions, as can be seen in Fig. 4a.

The spring piece 60 is arranged above and is formed of a number of portions. A resilient portion 62 is U-shaped or V-shaped and has a beveled portion 63 on the end. This can be seen most clearly in Fig. 5b, locked in the second locking position in the groove portion 18b.

The spring piece 60 further has a projecting planar portion 61 which, in the example shown, is obtained by a bent-back portion 61a with return via additional reinforcing wave portions 61b. This "front portion" can also be

a simple plate-like piece made of a sufficiently stable material which is provided on the right-hand end with a spring portion which corresponds to the portion 62, 63 freely visible in Fig. 4a.

The effect of this spring piece 60 is primarily that it is displaceable.

It is placed in the first locking position in the groove portions 18a, and the front portion 61 of this spring hardly projects out and, in the example shown, does not reach as far as an overlapping portion 71 of the carriage rail 70. In this locking position of the spring piece 60, the carriage can be pivoted into the carriage profile of the carriage rail 70 and pivoted out therefrom. In other words, the carriage can be used when the carriage is placed obliquely, the castors are placed on the track 75 and the carriage is placed in the profile by an inwardly directed pivoting movement. This position is shown in Fig. 4a and 4b. The carriage can also be removed by being pivoted back in the opposite direction. This occurs also, or only if the spring piece is in the position arranged in Fig. 4b and the spring piece is locked with the locking portion 62 in the grooves 18a.

The spring piece 60 is displaced in the direction F_{60}, as shown in Fig. 5a, The second locking position in the grooves 18b is obtained. In this case the portion 61 protrudes far and blocks a gap 71a which was previously free. This free gap is required for the pivoting in and pivoting out of the carriage. If the carriage is pivoted in and used, the gap 71a disturbs the reliable movement and could lead to the carriage springing out of its path 75. This can be prevented by inserting the spring piece 60 in the horizontal direction when the spring adopts the second locking position in the grooves 18b and the front portion 61 reduces the gap opening.

If forces act in the direction of a pivoting out or springing out of the carriage, the plate-like front portion 61 of the spring piece 60 can prevent the carriage from becoming detached from the carriage rail.

It can be seen that, according to Fig. 4a to 5b, the spring piece 60 formed entirely of spring steel sheet can also have merely one spring portion in the region 62, and the front (plate-like) portion 61 can be formed in a plate-like manner or as a plate (not shown), the plate thickness being suitably selected so as to reduce the vertical extent of the gap 71a.

The plate shape will thus be adopted over no more than a portion. The at least one, preferably two groove pairs 18a, 18b provide the locking position(s) of the spring piece and describe its position in a position allowing the pivoting in, according to Fig. 4b, and a position preventing the falling out or pivoting out, according to Fig. 5b.

The corresponding plate-shaped portion 61 of the spring piece is secured in the gap 71a. The gap 71a is substantially reduced. The extent of the reductions is a practically complete closure of the gap, as shown in Fig. 5b.

It should be noted that one of the locking positions 18a, 18b can also be omitted or can be a position of the spring piece retained by friction or clamping. This locking position is preferably that of the groove pair 18a. In this case the spring can also only be placed, without being separately locked in a relief along the edge, see Fig. 5a. Only the insertion F_{60} of the spring piece 60 and the locking in the groove pair 18b is expedient for the reliability of the blocking of the gap 71a.

Fig. 9 will be explained in greater detail in terms of the overall heights of the carriage and swing-out arm. In this case the swing-out arm can be seen from the outside from the viewing side. It has an overall height H_{30}. This overall height renders the swing-out arm 30 rigid and capable of bearing loads. The height H_{30} is practically the overall height H_{10}, which relates to the housing area 10 of the carriage. The height H_{30} is greater than at least 80 %, preferably greater than 90 % of the height H_{10}.

The size of the diameter of the castor 21 can also be seen and is practically the size H_{10}, in this case it is above 90 % to above 95 % of the height H_{10}.

Compared to the control arm 35, the overall height H_{30} of the swing-out arm 30 is substantially thicker, at least four times as thick in the vertical direction. The vertical extension of the control arm 35 is itself still to be considered as plate-shaped with a reinforcing impression 35c.

It can also be seen in Fig. 9 that there is no control arm visible or arranged above the upper face and below the lower face of the swing-out arm 30, and therefore the overall height of the swing-out arm 30 may contribute on

the whole to the load-bearing ability and rigidity of this arm, particularly if the gap 31 to be provided, in one example, does not reach completely through the transverse direction of the swing-out arm 30 and also extends only slightly in the longitudinal direction. There is therefore no reduction in the load-bearing capacity and rigidity of the swing-out arm 30.

The springing out of the carriage from the shape of the profiled rail 70 in the form of a carriage rail is prevented by a protrusion 17 which can be seen in Fig. 1 and 2 and in the views from the front of Fig. 4b and 5b. This is joined to the housing 10 and can be considered as part of the housing.

The gap 71a is dimensioned beneath the protruding portion 71 of the carriage rail 70 in such a way that this protrusion 17 can be pivoted in beneath 71 and security is provided against a springing out if the gap is reduced. If the carriage were stopped by an obstacle, the protrusion 17 would strike against the downwardly projecting protrusion 71, and with an inserted spring piece 60 the plate-like portion 61 would take up this impact, said portion lying on the protrusion 17. For this purpose, the portion 61 is made of the aforementioned, sufficiently stable material.

The longitudinal extension of the protrusion 17 can be limited, as shown in Fig. 2. The spring piece 60 preferably protrudes, via its plate-like portion at either end of the protrusion 17, beyond this in the longitudinal direction. The protrusion 17 supports the plate-like embodiment 61 of the spring piece 60 arranged thereon so as to avoid any slipping out of the spring piece 60 caused by operational movement.

The portion 61, acting plate like, can also protrude inwardly over the front end of the protrusion, as is shown in Fig. 5b. The spring piece shown there protrudes, via its plate-like portion 61 (by a U-shaped bending back of a spring steel sheet with reinforcements), in a frontwards direction (viewed to the left) beyond the safety protrusion 17.

KOMPAKT FUTÓKOCSI EGY PÁRHUZAMOSAN LEÁLLÍTOTT, BIZTOSÍTOTT HELYZETŰ AJTÓSZÁRNYHOZ

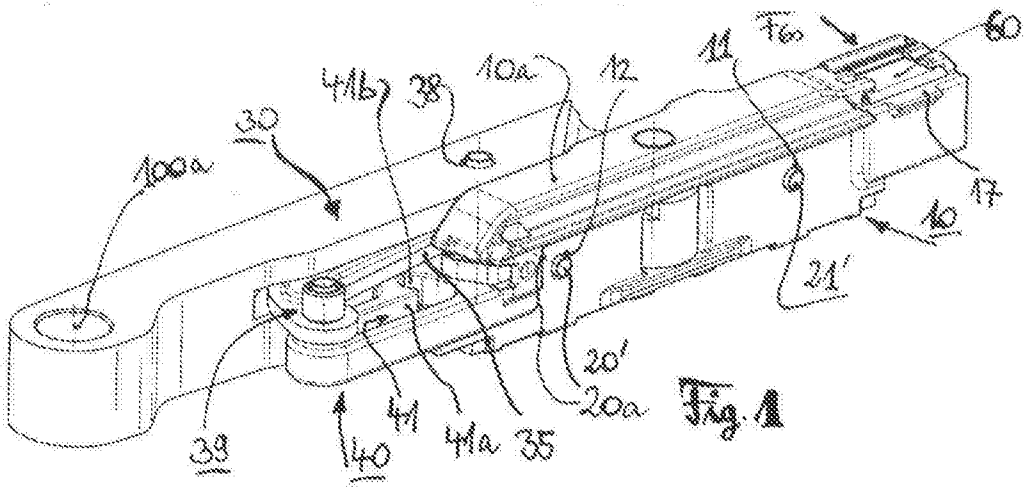
SZABADALMI IGÉNYPONTOK

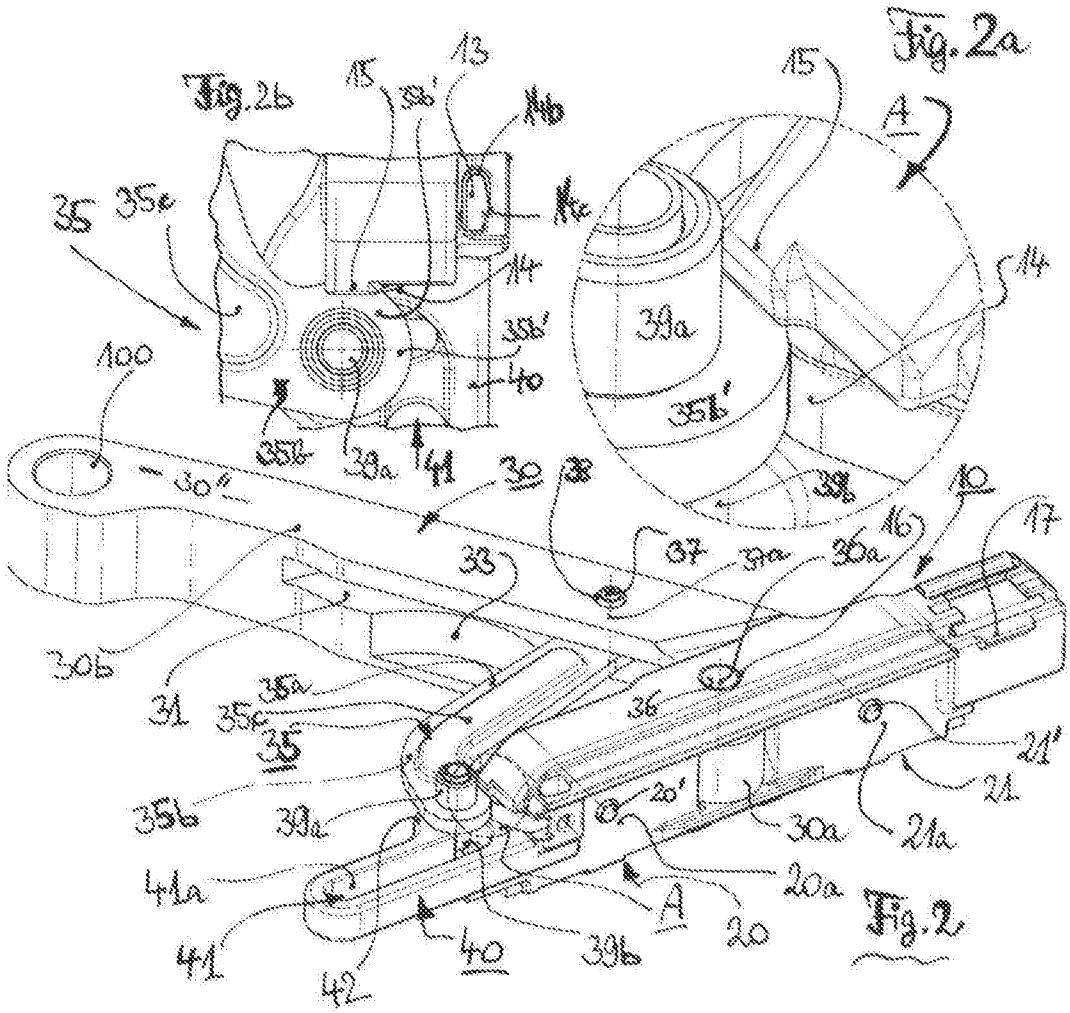
1. Futókocsi egy ajtószárny hosszirányú elmozdítására egy párhuzamosan leállított helyzetbe, egy háztartománnyal (10), egy kivető karral (30) és egy szabályzó karral (35), ahol a háztartomány (10) tartalmaz legalább két futógörgőt (20, 21) és egy alátámasztási helyet a kivető kar (30) billenő ágyazására, és ahol
   - a kivető kar (30) a szárny párhuzamos lehelyezésére tartalmaz egy távoli ágyazási helyet (100) a szárny részére és egy, a háztartományhoz (10) közelebbi ágyazási helyet (38) a szabályzó kar (35) részére;
   - a háztartomány (10) egy hosszirányában egy szabályzó szakasz (40, 41) helyezkedik el, és tartalmaz egy vezetéket (41) a szabályzó kar (35) másik végének részére;

   azzal jellemezve, hogy

   - a háztartomány (10) egy végszakaszába egy felfelé nézö rugóelem (60) van eltolhatóan beültetve, hogy a futókocsit egy beültető-billentö mozgás után a futókocsi beültetett állapotában egy futókocsi sín (70) egy átfogó szakaszával (71) szemben a rugóelem (60) eltolásával és ezzel egy, az átfogó szakasz (71) alatti hézag (71a) redukálásával biztosítsa.

2. Az 1. igénypont szerinti futókocsi, ahol a rugóelem (60) legalább szakaszonként lap alakban van kiképezve.
3. Az 1. vagy 2. igénypont szerinti futókocsi, ahol a rugóelem (60) egy első, reteszelő állásból egy második, messzebb a futókocsi sín (70) belsejében fekvő reteszelő állásba és onnan visszatolható.





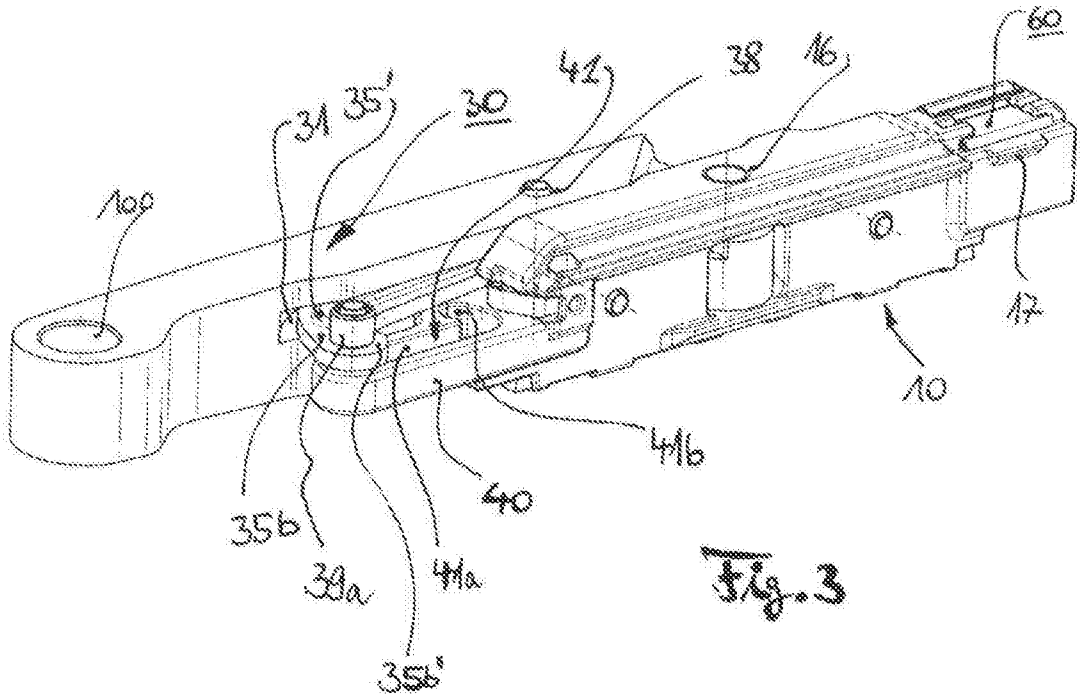


Fig. 3

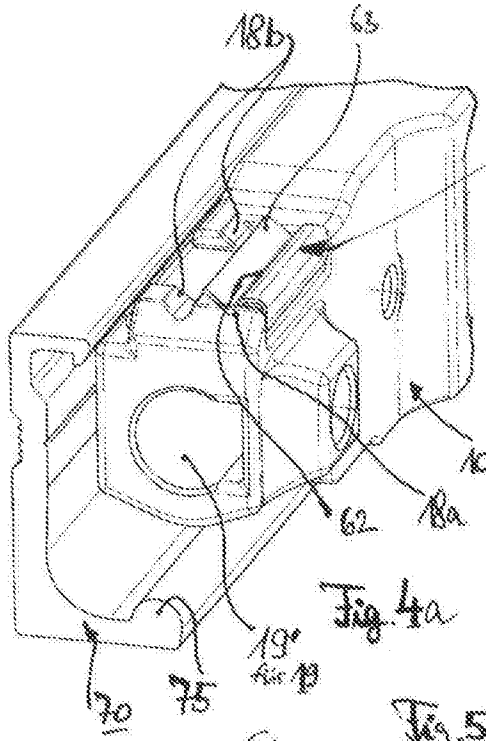


Fig. 4a

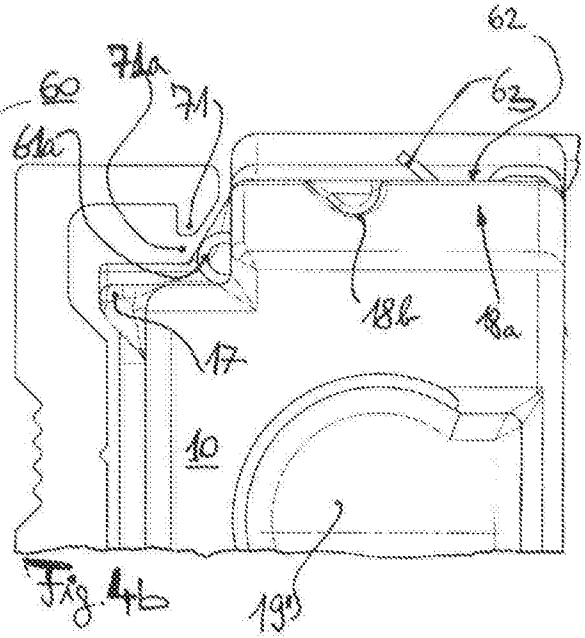


Fig. 4b

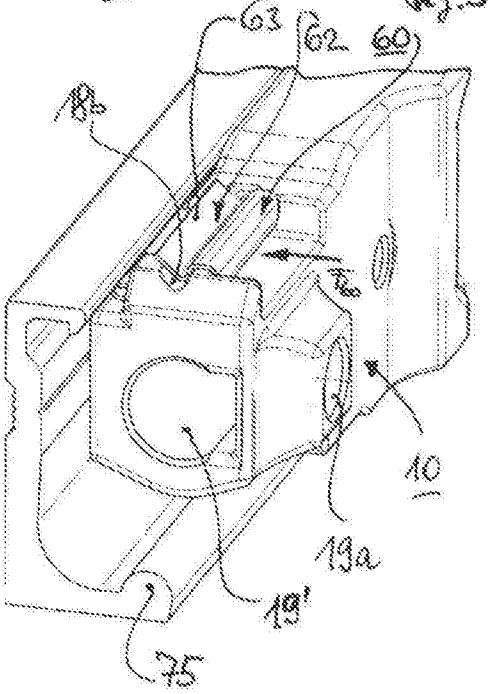


Fig. 5a

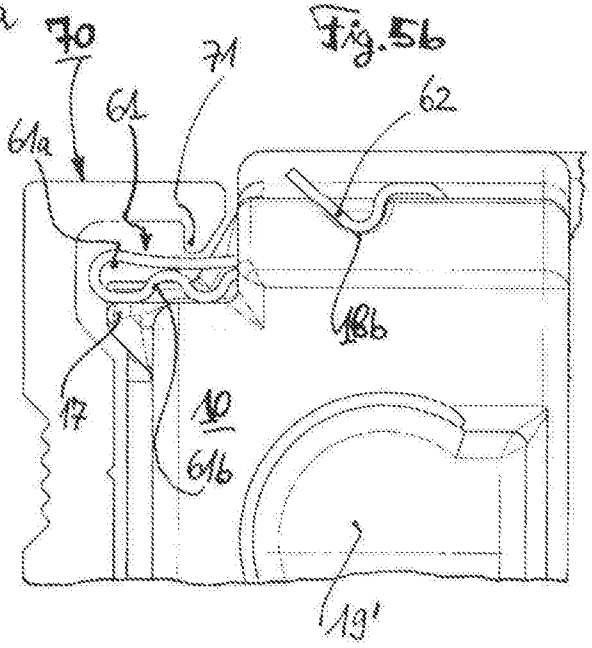


Fig. 5b

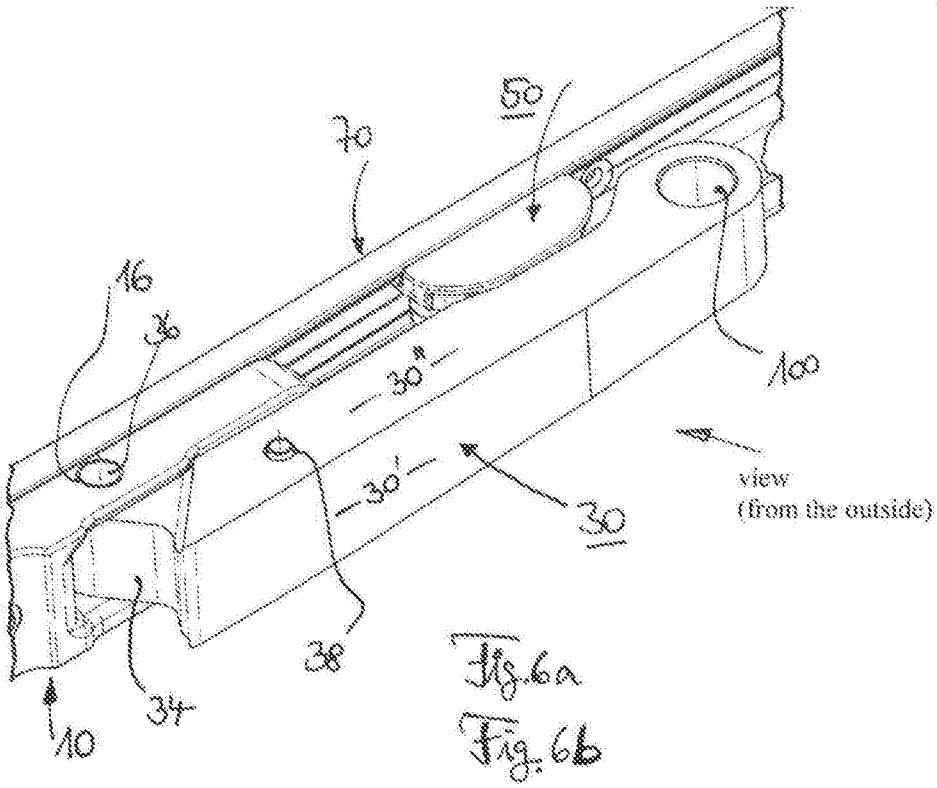
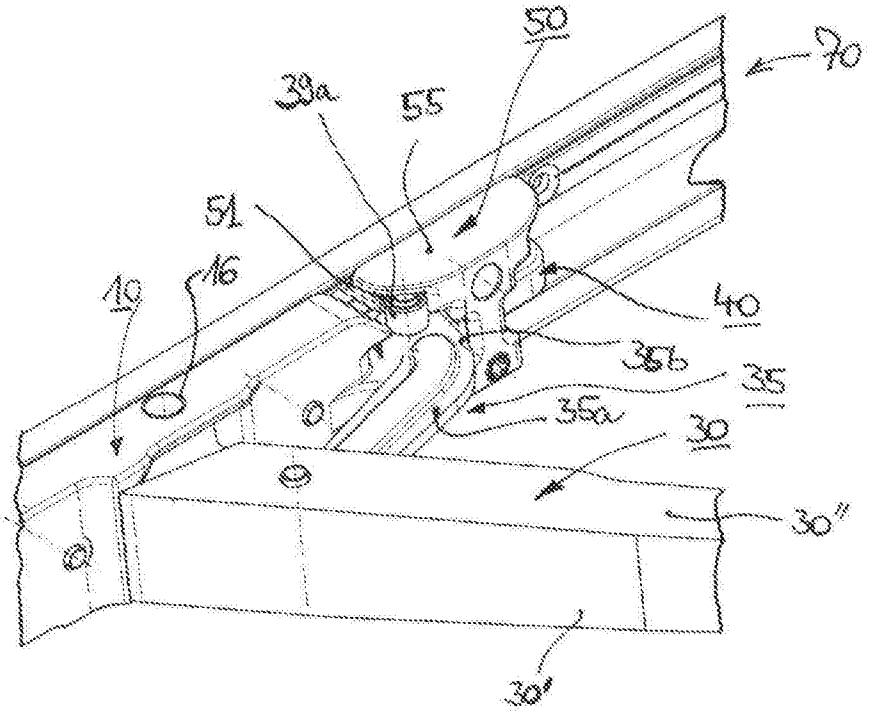

70
50
16
36
30"
100
30'
30
view
(from the outside)
38
34
10

Fig.6a

Fig.6b


50
70
39a
55
51
16
19
40
36b
35
36a
30
30"
30'

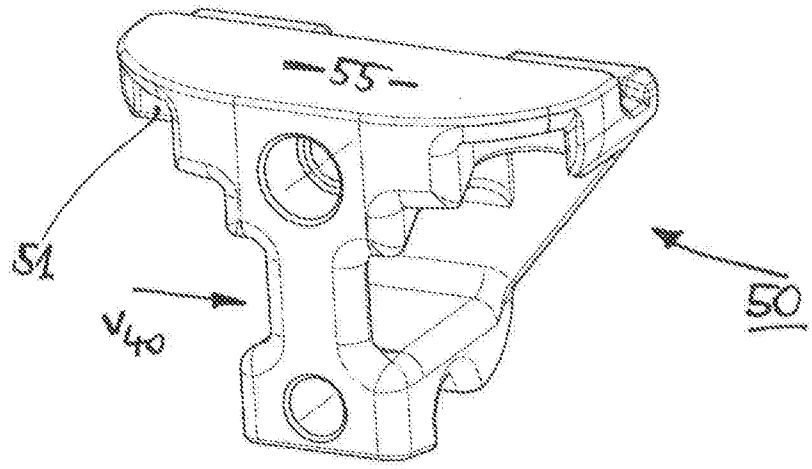
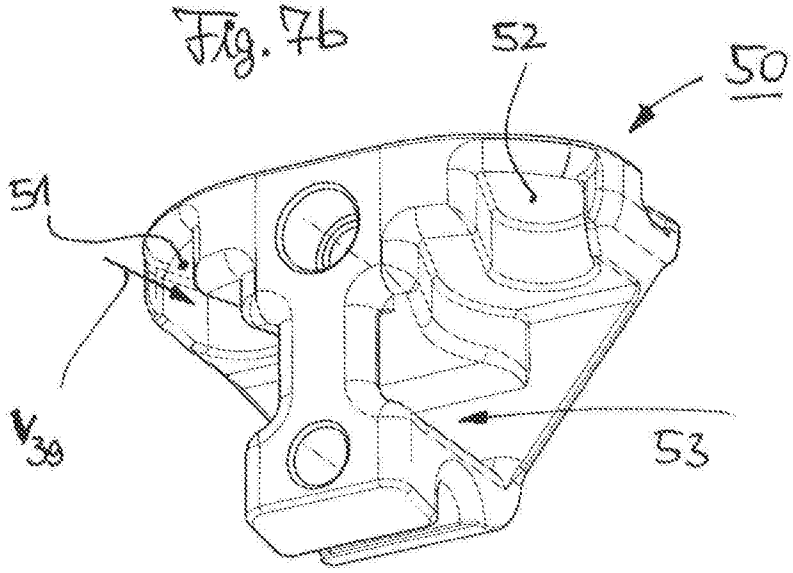


Fig. 7a

Fig. 7b



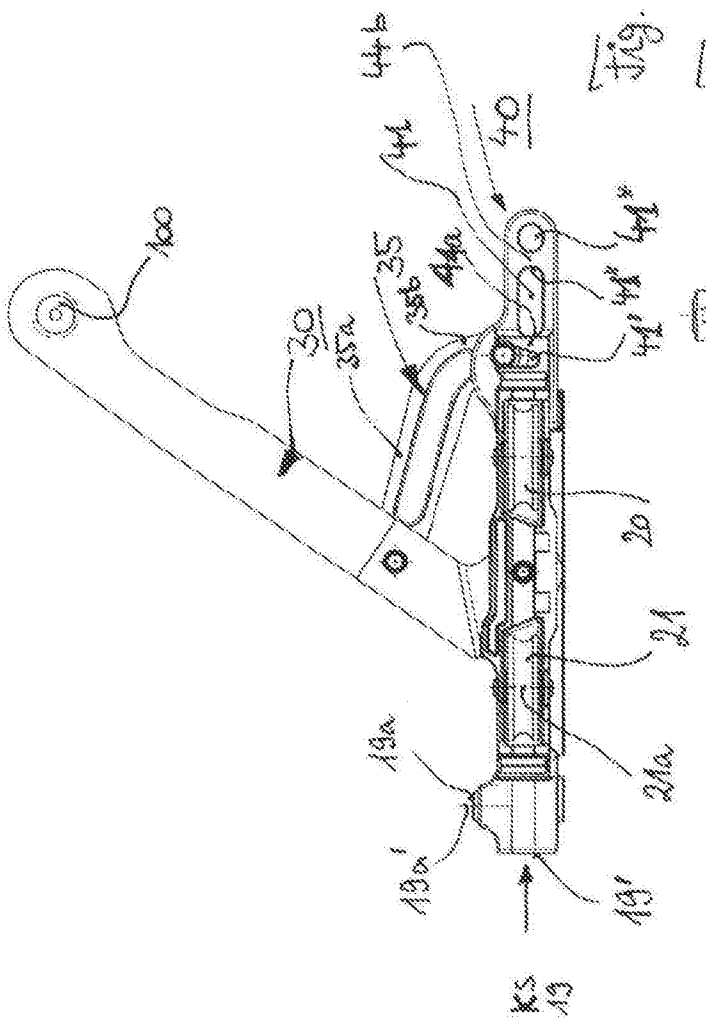

100
30
35a
35
44a
44b
40
41*
41'
20
21
21a
19a
19a'
19'
KS
13

Fig. 8

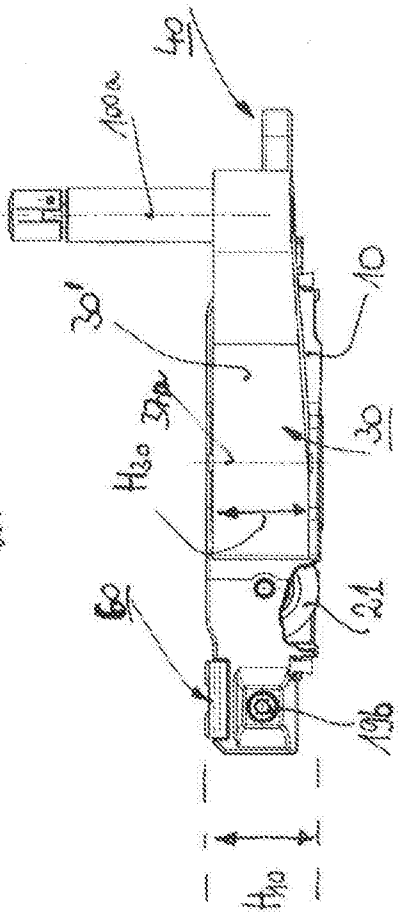

100a
40
10
30'
H30
30
60
21
19b
H10
L

Fig. 9

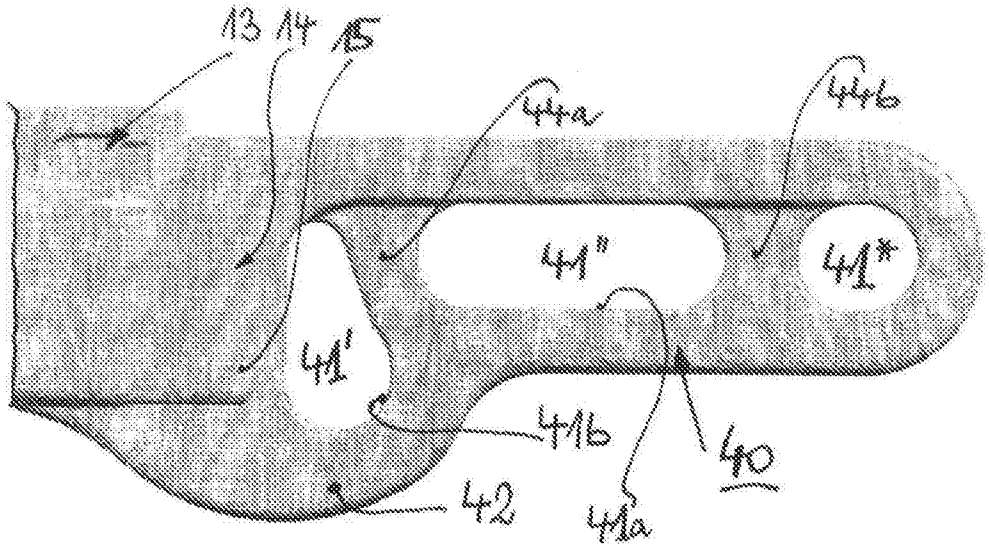


Fig. 10

Fig. 11

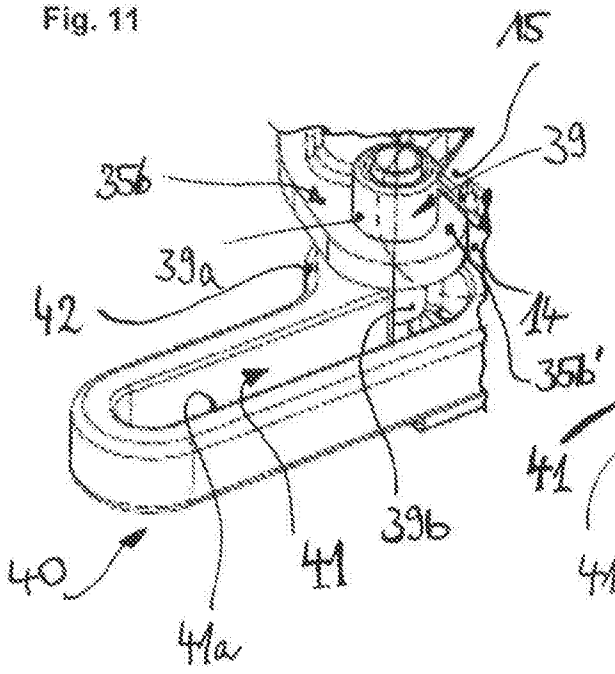


Fig. 12