



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 538 292 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
08.06.2005 Bulletin 2005/23

(51) Int Cl.7: **E05D 15/06**

(21) Application number: **04025011.0**

(22) Date of filing: **21.10.2004**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PL PT RO SE SI SK TR**
Designated Extension States:
AL HR LT LV MK

(72) Inventor: **Joki, Klaus**
731 60 Valskog (SE)

(74) Representative: **Reyier, Ann-Mari**
Bjerkéns Patentbyrå KB,
Box 128
721 05 Västerås (SE)

(30) Priority: **07.11.2003 SE 0302934**

(71) Applicant: **Joki, Klaus**
731 60 Valskog (SE)

(54) **A foldable covering of an opening**

(57) A device for foldable covering of an opening, comprising: a top railing (1) intended to be mounted to an upper part of the opening, a bottom railing intended to be mounted to a lower part of the opening, a plurality of sheets (3) arranged between the top railing and the bottom railing such that they together form a covering of the opening. At least one of the sheets being arranged displaceable along the railings (1, 2) and turnable in relation to the railings such that the sheet is placeable at an angle to the railing, at least one hinge pin (12) about which said sheet is turnable, wherein the hinge pin comprises a first part fixedly connected to the sheet and a second part arranged in connection to one of said railings and a locking member arranged to lock said hinge pin in its position along the railing when turning the sheet about the hinge pin. The locking member comprises a stopping member (22) arranged in fixed connection to the second part of the hinge pin, wherein the stopping member and the railing are formed to cooperate with each other in such a way that the stopping member is allowed to run freely in the railing when the sheet is substantially in parallel with the railing and that the stopping member is locked against motion along the railing when the sheet stands at an angle to the railing. The railing and the stopping member are shaped such that the stopping member influences the shape of the walls such that the groove expands and adapts after the shape of the stopping member during the turning.

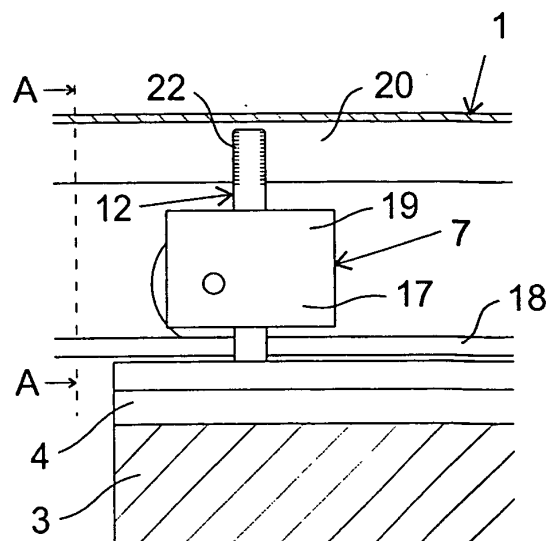


Fig 2

Description

TECHNICAL FIELD AND PRIOR ART

[0001] The present invention relates to a device for foldable covering of an opening comprising: a top railing intended to be mounted to an upper part of the opening, a bottom railing intended to be mounted to a lower part of the opening, a plurality of sheets arranged between the top railing and the bottom railing such that they together form a covering of the opening, wherein at least one of the sheets is arranged displaceable along the railings and turnable in relation to the railings such that the sheet is placeable at an angle to the railings, at least one hinge pin about which said sheet is turnable, the hinge pin comprising a first part fixedly connected to the sheet and a second part arranged in connection to one of said railings, a locking member arranged to lock said hinge pin in its position along the railing when turning the sheet about the hinge pin.

[0002] Such a device is particularly useful for glazing of balconies and areas outdoors, in which one sometimes wishes to clear the opening by bringing the glazing to one side and fold it. The invention is also useful in other applications in which foldable covering of an opening is desired.

[0003] Such a device for foldable covering is known from the patent document US 5 272 839. The glazing is folded by moving one sheet of glass at a time along the railing to one side of the opening and there turning them outwardly at an angle of about 90 degrees to the railings. While the sheets of glass are turned outwardly from the railing and when the sheets are folded out the locking member locks the hinge pin such that the sheet is held in its position along the railing. Thus it is prevented that the sheets are displaced along the railing after the sheets have been folded. The locking member shown in this document comprises a locking pawl arranged in connection to the hinge pin, a toothed rack arranged in connection to the railing and a spring keeping the locking pawl in place in the rack. When the sheet is turned outwardly the hinge pin is locked from movement along the railing by the locking pawl interfering with the rack. In the beginning of the turning, before the locking pawl has yet interfered with the rack, there is a risk that the sheet moves in the railing. To prevent this movement the sheet is provided with a wing-shaped supporting member having a surface arranged to, in the beginning of the turning, make contact with a protruding member mounted on the edge of the sheet. The surface of the wing-shaped member is convex in its shape.

[0004] One drawback with the device shown in said document is that the locking member is complicated, comprises several parts and can therefore easily fail.

[0005] The patent document US5548926 shows a device for foldable covering of an opening comprising a railing, which in its upper end has been provided with a longitudinal groove in the form of an opening arranged

along the railing. A number of expansions are arranged along the groove. The expansions are intended to receive a stopping member, when turning the sheet. The expansion has a radius, which is substantially larger than the width of the groove. The stopping member has a first and a second extension, wherein the first extension is substantially smaller than the second extension. The stopping member runs with its first extension across the groove, when the sheet is displaced along the groove 1. When the sheet is turned outwardly, the stopping member rotates in the expansion and in such a way ends up with its second extension across the groove and in such a way becomes locked from motion along the groove. The drawback of such a locking member is that the groove must be provided with expansions and that the stopping member must fit exactly into the expansion in order for it to be possible to turn the sheet. This can be experienced as laborious for a user since it may be difficult and time consuming to fit the stopping member exactly into the expansion. Another drawback is that the manufacture of the railing becomes more complicated.

[0006] The patent document US5548926 shows a device for locking a window in an open position. The locking device comprises a cam provided with a springy finger. The cam has a first and a second extension, wherein the first extension is substantially smaller than the second extension. The cam is brought along a longitudinal notch in the window frame. The window is locked in a certain position by rotating the cam such that its second extension is across the notch and the springy finger is in contact with a wall of the notch. The springy finger thus acts with a force against the wall and locks in such a way the cam towards the wall. The drawback with such a locking member is that the cam and the springy finger are expensive and difficult to produce.

THE OBJECT AND SUMMARY OF THE INVENTION

[0007] The object of the present invention is to indicate a device for foldable covering of an opening having a locking member, which is simple to use, robust, durable, inexpensive and easy to manufacture.

[0008] This object is achieved with the device for foldable covering of an opening such as the one described in claim 1.

[0009] A locking of the movement of the hinge pin along the railing is achieved when the sheet is turned outwardly from the railings and forms an angle to them. The locking member according to the invention comprises only one extra part, i.e. the stopping member, apart from the parts that are already present in the device. The stopping member has, in a cross section along the railing, a first extension along a first axis and a second extension along a second axis being perpendicular to the first axis, wherein the first extension is smaller than the second extension. Such a locking member is robust, durable and simple to produce and to mount. The stopping member comprises two opposite, substantially

convex portions intended to bear against the railing when turning the sheet about the hinge pin. The convex portions have a substantially uniform radius and the distance between them constitute the second extension of the stopping member. Thanks to these convex portions the stopping member and thus the hinge pin may rotate about its own axis when turning the sheet.

[0010] According to the invention the railing and the stopping member are shaped such that the stopping member influences the shapes of the walls during the turning such that the groove widens and adapts to the shape of the stopping member. Thanks to that the railing adapts to the shape of the stopping member after some or a few turns, the railing does not need to be provided with any expansions. This means that the sheet may be turned outwardly anywhere along the railing, without the need of fitting the stopping member exactly into any expansion.

[0011] According to an embodiment of the invention the railing is formed in a material, which is softer than the material in which the stopping member is formed. With advantage the groove has a width, which is larger than the first extension of the stopping member and somewhat smaller than the second extension of the stopping member. It is an advantage to produce the railing in a softer material than the stopping member, such that the material in the railing can be shaped after the shape of the stopping member when the stopping member is turned in the railing. The first times the sheet is turned it is somewhat heavy but after a few turns the part of the railing cooperating with the stopping member has formed after the stopping member and it is easier to turn the sheet.

[0012] According to a further embodiment of the invention said convex portions (29, 30) are provided with elongate, protruding elements arranged to cut into the railing during the turning. For example the convex portions are provided with threads or transverse notches. This in order to make it even easier for the railing to be shaped after the shape of the stopping member. The threads or the protruding portions between the notches cut into the railing and in such a way widens the part of the railing in which the stopping member is rotated.

[0013] According to a further embodiment of the invention the locking member comprises a guiding member protruding from the railing, which is arranged with one face turned towards the sheet, which face comprises at least one section having a concave surface arranged to cooperate with an edge of the sheet or with a part protruding from the edge, in order to prevent that the hinge pin moves along the railing during an initial phase of the turning of the sheet. In the beginning of the turning, i.e. when the angle between the railing and the sheet still is small, the locking member has not yet begun to lock the hinge pin in its position along the railing. In order to prevent that the sheet slides backwards along the railing during this initial phase the railing is provided with a guiding member with a concave surface. The con-

cave surface makes that the guiding member and the edge of the sheet, or the part protruding from the edge, are in contact with each other for a longer part of the turning, in comparison with if the surface would be straight or convex. It is desirable that the guiding member and the edge of the sheet, or the part protruding from the edge, are in contact with each other until the locking member has locked the hinge pin in its position along the railing.

[0014] According to a further embodiment of the invention the sheet comprise two hinge pins arranged in line with each other, about which said sheet is turnable, wherein one hinge pin is arranged in connection to the top railing and the second hinge pin is arranged in connection to the bottom railing, wherein both hinge pins comprises said stopping member. In order to achieve a stable turning both ends of the sheet should be provided with hinge pins, each having a stopping member locking the hinge pin in a position along the railing during the turning of the sheet.

[0015] According to an embodiment of the invention the stopping member constitutes an elongation of the hinge tap. Such a device comprises no extra parts apart from those already present in the device, and is thus even more robust and durable.

SHORT DESCRIPTION OF THE DRAWINGS

[0016] The invention is now to be explained closer by describing different embodiments of the invention and with reference to the attached drawings.

Fig. 1 schematically shows a front view of a device for foldable covering of an opening according to a first embodiment of the invention.

Fig. 2 shows a detailed view in a larger scale illustrating the configuration of the locking member in fig. 1 when the sheet is in parallel with the railing.

Fig. 3 shows a side view of the locking member in fig. 2 when the sheet is in parallel with the railing.

Fig. 4 shows a side view of the locking member when the sheet is turned 90 degrees in a relation to the railing.

Fig. 5a shows the locking member in an unlocked position in a view seen from above.

Fig. 5b shows the locking member in a position in which it begins to lock.

Fig. 5c shows the locking member in a locked position.

Fig. 6 shows the device according to the invention seen from above when the sheet is in parallel with the railing.

Fig. 7 shows the device according to the invention seen from above when the sheet is at an angle in relation to the railing.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

[0017] Fig. 1 shows a device for removable covering of an opening according to a first embodiment of the invention. The opening is for example arranged in a building. The device comprises a top railing 1 intended to be mounted to an upper part of the opening and a bottom railing 2 intended to be mounted to a lower part of the opening. The top and the bottom railings 1, 2 are elongate and extend substantially horizontally along the opening. The railings 1, 2 are formed in some soft material, preferably some soft metal, for example aluminum.

[0018] Between the top and the bottom railings a number of sheets 3 are arranged displaceable along the railings 1, 2. The sheets 3 are for example made of some transparent material such as glass or plastic, but can also be made by a non-transparent material such as a laminate. The sheets are arranged such that they together form a covering of the opening. The sheets form a wall together protecting against cold winds, rain and snow. On the other hand, if the weather is sunny, it is desirable that the sheets of glass can be moved aside to let in sun and warmth. By moving the sheets 3 aside and turning them at a 90-degree angle in relation to the railings the entire or part of the opening may be cleared and glass cleaning can be performed from inside the balcony or the outdoor area.

[0019] The sheet 3 is in its upper end provided with an upper supporting profile 4 carrying the sheet and the sheet is in its lower part provided with a lower supporting profile 5. The upper and the lower supporting profiles are fixedly mounted to the sheet and are preferably formed in aluminum. The upper supporting profile 4 is provided with a first and a second wheeling arrangement 7, 8 arranged to roll along the top railing 1. The lower supporting profile 5 is in the same way provided with two wheeling arrangements 9, 10 arranged to roll along the bottom railing. The first wheeling arrangement 7, 9 is arranged in one end of the supporting profile 4, 5. The second wheeling arrangement 8, 10 is fixedly mounted in the vicinity of the opposite end of the supporting profile. The distance between the end of the supporting profile and the second wheeling arrangement 8, 10 differ for different sheets 3.

[0020] The sheet 3 is turnable about two hinge pins 12, 14 arranged in line with each other and perpendicular to the extension of the railings. The sheet 3 is thus turnable about an axis perpendicular to the length axis

of the railings 1, 2. An upper hinge pin 12 extends from the upper supporting profile 4, through the wheeling arrangement 7 and into the top railing 1. A lower hinge pin 14 extends from the lower supporting profile 5, through the wheeling arrangement 9, and into the bottom railing 2. The top railing 1 is provided with an opening 15, through which the wheeling arrangement 8 can pass when turning the sheet 3. An analogous opening is arranged in the bottom railing 2. When the device is to be folded the sheets 3 are moved one at a time to one end of the opening and the sheets are turned such that they stand in a 90-degree angle to the opening.

[0021] Fig. 2 shows in closer detail the appearance of the wheeling arrangement 7 and the hinge pin 12. The wheeling arrangement 7 comprises two parallel wheels wherein one wheel 17 is visible in the figure. Further, the wheeling arrangement 7 comprises a body 19 upon which the wheels are suspended. The wheels run along a flange 18 extending along the top railing 1. In the upper end of the top railing 1 a longitudinal groove 20 or a notch is arranged, extending along the entire length axis of the railing. The hinge pin 12 is pole shaped and is in its lower end fixed to the upper supporting profile 4 of the sheet 3 and comprises in its upper end a stopping member 22. The stopping member 22 extends into the groove 20 and is arranged to run along the groove when the sheet 3 is parallel to the railing 1. The body 19 is provided with a through-hole, intended to receive the hinge pin 12. The hinge pin 12 is arranged turnable in a relation to the body 19. The stopping member 22 constitutes the upper part of the hinge pin 12. The stopping member has a length axis coinciding with the length axis of the hinge pin. The stopping member is fixedly connected to or is a part of the hinge pin. Thus a turning of the hinge pin also causes a turning of the stopping member. The stopping member is made of a material, which is harder than the material of which the profile 1 is made, for example of steel.

[0022] Fig. 3 shows a cross section through the profile 1 along a section A-A in fig. 2. The railing 1 comprises a protruding part 24, which extends along the entire length of the railing and has a substantially U-shaped cross section. The protruding part 24 comprises two parallel walls 26, 28, the insides of which are arranged to cooperate with the stopping member 22. The walls 26, 28 and the space between them form the groove 20. When the sheet 3 is in parallel with the top and the bottom railings the stop member 22 can run freely in the groove 20 and the sheet is displaceable along the railings.

[0023] Fig. 4 shows how the stopping member 22 cooperates with the groove 20, when the sheet 3 stands at a 90 degrees angle in a relation to the top and bottom railings. Since the stopping member 22 is arranged fixedly in relation to the sheet 3, the stopping member is turned when the sheet 3 is turned.

[0024] Figs. 5a-5c show how the stopping member 22 is turned in relation to the groove 20 when the sheet is

turned. Fig. 5a shows a section B-B through the protruding part 24 and the stopping member 22 in fig. 3. Fig. 5c shows a cross section C-C through the protruding part 24 and the stopping member 22 in fig. 4. The stopping member 22 has a first extension a along a first axis 32 through the stopping member and a second extension b along a second axis 34, which is perpendicular towards the first axis 32. The extension a is substantially smaller than the extension b. For example the extension a is about 4 mm and the extension b is about 6 mm. The groove 20 has a width c, which is larger than the first extension a of the stopping member and smaller than or equal to the second extension b of the stopping member. For example c is about 5,5 mm.

[0025] The stopping member 22 is substantially cylinder shaped having two opposite, substantially planer faces and two opposite substantially convex faces. Preferably the hinge pin 12 and the stopping member is made from a screw, on which two opposite sides in the threaded end of the screw has been bevelled. The stopping member 22 comprises two opposite, substantially convex portions 29, 30, each of which having a convex surface intended to bear against the inside of the walls 26, 28 in the groove 20 when turning the sheet about the hinge pin 12. The convex portions 29, 30 are formed with a uniform radius, which is equal for both portions. The stopping member 22 is arranged such that it runs along the groove 20, with its first axis 22 substantially across the groove 20 when the sheet is substantially parallel with the railings. Thanks to the first extension a being smaller than the width c of the groove 20 the stopping member 22 and thus the sheet 3 runs easily along the railing 1, as long as the sheet is in parallel with the railings. When the sheet begins to be turned outwardly from the railings, as is shown in fig. 5b, the convex portions 28, 30 will contact the walls 26, 28.

[0026] Thanks to the stopping member 22 having a second extension b, which is equal to or somewhat larger than the width c of the groove 20 the stopping member 22 becomes locked from motion along the railing 20 when the sheet is turned in a relation to the railing. Thanks to the convex portions 29, 30 being shaped with a uniform radius a turning about the length axis of the stopping member is allowed simultaneously and thus also about the length axis of the hinge pin. The convex portions 29, 30 are provided with threads in order for them to cut into the walls in the groove and to in such a way further lock the stopping member from motion along the railing. In an alternative embodiment the convex portions may instead be provided with transverse notches.

[0027] The stopping member 22 begins to lock when the convex portions 29, 30 makes contact with the walls 26, 28 of the railing 1. This means that the sheet 3 must be turned outwardly to a certain angle before the stopping member begins to lock from motion along the railing. The stopping member 22 will always be turned in relation to the railing in approximately the same position along the railing. This means that the walls in the groove

at this position will at least partly be hollowed out and shaped by the turning motion of the stopping member. This means that it will be heavy the first times the sheet is turned but the more times the sheet has been turned the turning will be easier.

[0028] The figures 6 and 7 show a device according to the invention seen from above. In order to prevent the hinge pin 12 from moving along the railing 1 during an initial phase of the turning of the sheet 3, i.e. before the convex portions 29, 30 has made contact with the walls 26, 28, the railing 1 is provided with a guiding member 40 arranged with one face turned towards the sheet 3 during the beginning of the turning. The face comprises at least one section 42 having a concave surface, which is arranged to cooperate with some protruding part arranged on the upper part of the sheet. In this embodiment example the face 42 cooperates with the wheeling arrangement 8. The guiding member 40 and the wheeling arrangement 8 are arranged in such a way that they are in contact with each other during the initial phase of the turning of the sheet and in such a way are prevented the sheet and the hinge pin from moving along the railing 1. Thanks to the concave surface 42 the guiding member 40 holds the sheet 3 in place during the entire initial phase of the turning.

[0029] The present invention is not limited to the embodiments shown but can be varied and modified within the framework of the following claims.

Claims

1. A device for foldable covering of an opening, comprising:
 - a top railing (1) intended to be mounted to an upper part of the opening,
 - a bottom railing (2), intended to be mounted to a lower part of the opening,
 - a plurality of sheets (3) arranged between the top railing and the bottom railing such that they together form a covering of the opening, wherein at least one of the sheets is arranged displaceable along the railings (1, 2) and turnable in relation to the railings such that the sheet is adjustable at an angle towards the railings,
 - at least one hinge pin (12, 14) about which said sheet is turnable, wherein the hinge pin comprises a first part fixedly connected to the sheet and a second part arranged in connection to one of said railings comprising a longitudinal groove with two walls (26, 28), and
 - a locking member arranged to lock said hinge pin in its position along said groove when turning the sheet about the hinge pin, wherein the locking member comprises a stopping member (22, 54) arranged in fixed connection to the second part of the hinge pin, wherein the stopping

member, in a cross section along the groove, has a first extension (a) along a first axis (32) and a second extension (b) along a second axis (34), which is perpendicular to the first axis, wherein the first extension is smaller than the second extension,

wherein the stopping member and the railing are shaped to cooperate with each other in such a way that the stopping member is allowed to run freely in the railing when the sheet is substantially in parallel with the railings and that the stopping member is locked from motion along the railing when the sheet stands at an angle to the railings, **characterized in that** the stopping member comprises two opposite, substantially convex portions (29, 30), each of which having a surface intended to bear against said walls (26, 28) in said groove in the railing when turning the sheet about the hinge pin (12), that the convex portions have a substantially uniform radius, that the distance between the surfaces of the convex portions constitute the second extension (b) of the stopping member, wherein the railing and the stopping member are shaped such that the stopping member influences the shape of the walls such that the groove expands and adapts to the shape of the stopping member during the turning.

2. A device according to claim 1, **characterized in that** the railing (1,2) is formed in a softer material than the material in which the stopping member (22) is formed.
3. A device according to claim 2, **characterized in that** said groove (20; 50) has a width (c) which is larger than the first extension (a) of the stopping member and somewhat smaller than the second extension (b) of the stopping member.
4. A device according to any of the previous claims, **characterized in that** and that said convex portions (29, 30) are provided with elongate, protruding elements arranged to cut into the walls of the groove during the turning.
5. A device according to any of the previous claims, **characterized in that** said convex portions (29, 30) are provided with threads or transverse notches.
6. A device according to any of the previous claims, **characterized in that** the locking member comprises a guiding member (40) protruding from the railing and arranged with one face turned towards the sheet, which face comprises at least one section having a concave surface (42), which is arranged to cooperate with an edge of the sheet (3) or with a part (8) protruding from the edge, to prevent movement of the hinge pin (12) along the railing during

an initial phase of the turning of the sheet.

7. A device according to any of the previous claims, **characterized in that** the sheet (3) comprises two hinge pins (12, 14) arranged in line with each other, about which said sheet is turnable, one of the hinge pins (12) being arranged in connection to the top railing (1) and the other hinge pin (14) being arranged in connection to the bottom railing (2), wherein each hinge pin comprises said stopping member (22; 54).

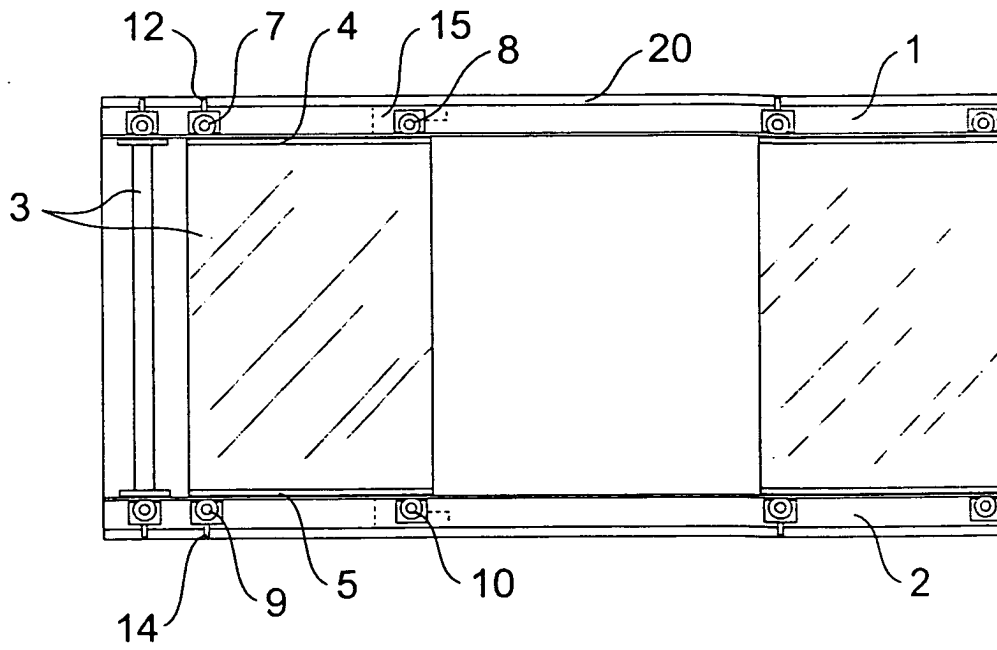


Fig 1

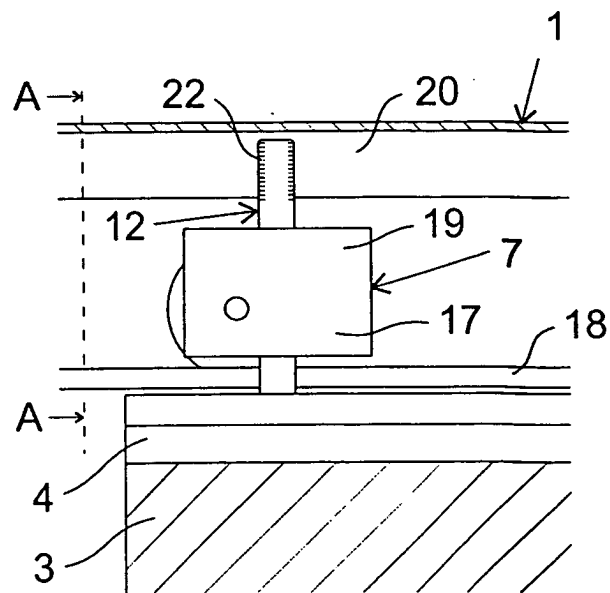


Fig 2

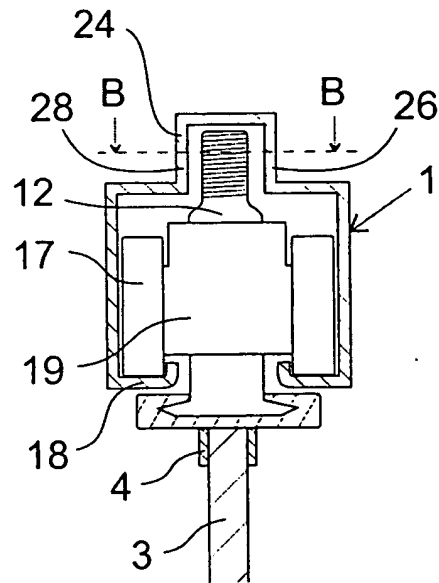


Fig 3

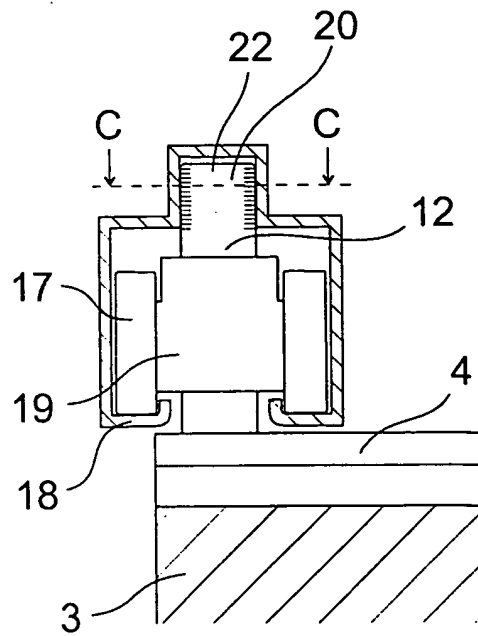


Fig 4

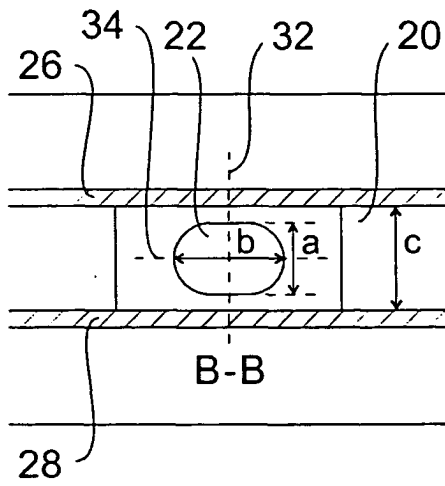


Fig 5a

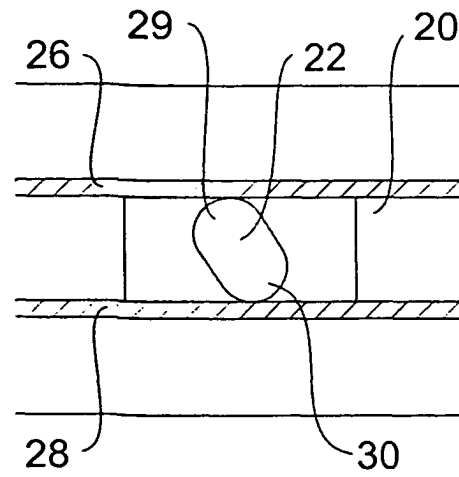


Fig 5b

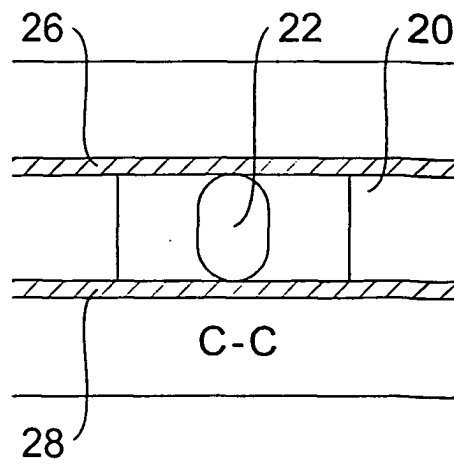


Fig 5c

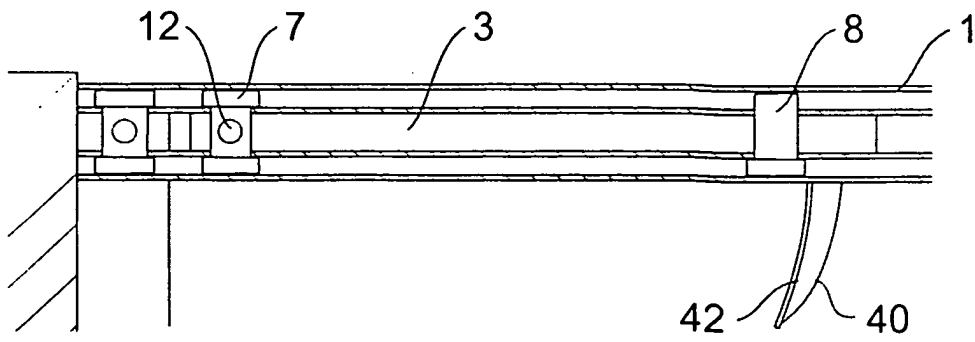


Fig 6

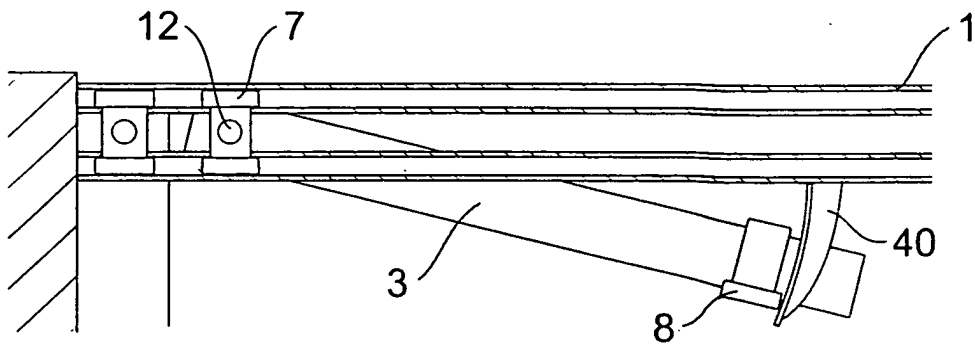


Fig 7