(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 307 652 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
04.06.2014 Bulletin 2014/23

(21) Application number: **08758221.9**

(22) Date of filing: **10.06.2008**

(51) Int Cl.:
E06B 9/307 *(2006.01)*

(86) International application number:
PCT/DK2008/000212

(87) International publication number:
WO 2009/149708 (17.12.2009 Gazette 2009/51)

(54) **SCREENING DEVICE WITH A LOCKING MECHANISM FOR A TILT DEVICE**

VORHANG MIT EINER MITNAHMEMECHANIK FÜR EINE WENDEVORRICHTUNG

DISPOSITIF D'OCCULTATION AVEC MÉCANISME DE BLOCAGE POUR UN DISPOSITIF D'INCLINAISON

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR

(43) Date of publication of application:
13.04.2011 Bulletin 2011/15

(73) Proprietor: **VKR Holding A/S**
2970 Hørsholm (DK)

(72) Inventors:
- **BIRKKJÆR, Martin**
  DK-6731 Tjæreborg (DK)
- **KOLD, Ove**
  DK-6900 Skjern (DK)

(74) Representative: **Koch, Jakob et al**
Awapatent A/S
Rigensgade 11
1316 Copenhagen K (DK)

(56) References cited:
EP-A- 0 976 908
WO-A-2004/029397
DE-A1- 2 732 171
GB-A- 2 434 824
US-A- 5 934 351

EP 2 307 652 B1

Printed by Jouve, 75001 PARIS (FR)

Description

[0001] The present invention relates to a screening arrangement comprising, a top element having a longitudinal direction, which is adapted to be positioned along a longitudinal direction of a top piece of a frame in a condition of use, and a height direction, which is adapted to be positioned along a longitudinal direction of a side piece of a frame in a condition of use,
a screening device comprising a plurality of tiltable slats adapted to at least partly screening an aperture of a frame, and a tilt cord connected to said slats and a tilt assembly accommodated in said top element and being movable in the longitudinal direction of said top element between a first and a second end position,
an operating cord extending in the longitudinal direction inside said top element and connected to said tilt assembly for tilting said slats between a first and a second predetermined position.

[0002] Screening arrangements such as Venetian blinds are widely used for screening an opening of a building such as a window in order to screen the light directly penetrating into the building or to prevent persons from being able to look directly into the building. Hence, it is important to adjust the screening arrangement so that the visibility into the building is kept at a minimum, while the amount of light entering the building is suitable for the persons inside the building.

[0003] Therefore screening arrangements are designed with slats being tiltable in order to provide the above-described flexibility. In such screening arrangements the tilts can be tilted so that they fulfil the need for light penetration and visibility. Slats of a screening arrangement can provide a light regulating effect by guiding the light penetrating through the slats up in the ceiling or down towards the floor.

[0004] Different ways of tilting the slats in a Venetian blind are known. For example it is well known to tilt the slats by rotating a rod, where the slats can be tilted between a vertical position wherein the slats provides a maximum screening of the window aperture and a horizontal position wherein the slats are oriented in a position allowing maximum light to penetrate the building.

[0005] In typical Venetian blinds the slats are provided in at least two vertically-extending slat-supporting cord ladders each comprising a first and a second vertical member connected by a plurality of vertically-spaced cross-rungs. By pulling said first or second said cord ladders the slats can be tilted according to the need of the user. The cord ladders are typically connected to a relatively thin shaft extending in the longitudinal direction of a top element of the screening arrangement, which shaft is connected to a rod by a transmission such a as a worm gear. However, this design has shown to be very prone to damage the slats and typically the rod is positioned where it impairs the view of the window. When the slats are positioned in the vertical position, an attempt to tilt them further by using a for instance a rod, will eventually result in damaging of the slats or parts of the screening arrangement.

[0006] Several attempts has been made to provide a more easy operable and gentle way of tilting slats of screening arrangements in a flexible way.

[0007] WO 2004/029397 discloses a screening arrangement for tilting slats of a screening device comprising a plurality of slats. The screening arrangement comprises a rotatable shaft in connection with tilt cords connected to the slats. The tilt cords and the shaft are connected by a disconnecting mechanism comprising a spring wound around the shaft. When rotating the shaft end portions of said spring is adapted to engage with end positions of the disconnecting mechanism in order to release the spring from the shaft. Thereby it is possible to rotate said shaft without tilting the slats and achieve different positions of the handle with respect to the top element. The shaft is rotated by a cord loop with a handle, which cord loop extends between an upper and a lower turning point of the window where the screening arrangement is installed. In order to provide a proper rotation of the shaft by moving the handle, the shaft and the cord loop is connected by a geared transmission.

[0008] GB 2434824 discloses a mechanism for tilting slats of a Venetian blind by using a tilt assembly comprising a base portion with an aperture and a slide portion attached to the base portion. The base portion is fixed in relation to an aperture of a supporting bottom portion of a top element of a screening device. The side portion is slidably movable with respect to the base portion and a tilt cord in connection with slats of the blind is connected to the slide portion. When the slide portion is moved in either longitudinal direction of the top element the slats are tilted from one position to another. The tilt portion is moved by means of cord loop, which is connected to the tilt assembly by means of a geared transmission.

[0009] DE 27 32 171 discloses a screening arrangement with a top element comprising tilt assembly provided with two lever arms. The tilt assembly is movable between two end positions and when the operating cord of the screening arrangement is pulled in one direction of the top element, a first lever arm locks the operating cord with respect to the tilt assembly, and when the operating cord is pulled in the opposite direction a second lever arm locks the operating cord to the tilt assembly, i.e. the operating cord is only locked in one of the lever arms two positions.

[0010] In the light of the above it is the object of the present invention to provide a flexible positioning of an operating handle for a slidably movable tilt assembly of a screening arrangement.

[0011] These and further objects are met by a screening arrangement of the kind mentioned in the opening paragraph, which is further characterized in said tilt assembly comprises a locking mechanism adapted to connect said operating cord to said tilt assembly, and in that said locking mechanism has a locking condition allowing said operating cord to move said tilt assembly between

said first and second end positions, and an unlocking condition wherein said operating cord is movable in said longitudinal direction of said top element without moving said tilt assembly.

[0012] The provided locking mechanism having two conditions of operation, can be used in combination with different types of tilt assemblies and provide a flexible positioning of the operating handle during use.

[0013] In a structurally simple preferred embodiment, said locking mechanism is a lever arm being movable between two end positions and wherein said locking condition is achieved in said end positions.

[0014] In this way it is possible to position the operating handle of the screening arrangement when the slats has been tilted to their end position, which corresponds to the respective end positions of the tilt assembly.

[0015] In a mechanically preferred embodiment, said first and second end positions of said tilt assembly is adapted to move said lever arm to said unlocking condition.

[0016] In a further development of this embodiment, a longitudinal direction of said lever arm in said unlocking condition is substantially perpendicular to the longitudinal direction of said top element.

[0017] In an even further development of this embodiment, said lever arm comprises a pin adapted to move said lever arm to the unlocking condition when said tilt assembly is moved to said first and second end positions.

[0018] In a further mechanically simple embodiment, said locking mechanism comprises a recess or a bore adapted to receive said operating cord and to provide a pull resistance when pulling said operating cord.

[0019] In a further development of this embodiment, the pull resistance is increased when said operating cord is pulled.

[0020] In an even further development of this embodiment, the recess comprises a substantially sharp edge for squeezing the operating cord between a portion of the locking mechanism and the tilt assembly.

[0021] In a preferred embodiment especially suitable for the adjusting the position of the operating handle, the screening arrangement further comprises two side rails adapted to be positioned on side pieces of a frame and wherein at least one of said side rails comprises a operating handle in connection with said operating cord.

[0022] In the following the invention will be described in further detail by means of examples of embodiments with reference to the schematic drawing, in which

Fig. 1 is a front view of a window provided with a screening arrangement in an embodiment of the invention,

Fig. 2 is a front view of a screening arrangement according to Fig. 1,

Fig. 3 shows a perspective view of the screening arrangement of Fig. 1,

Fig. 4 shows a perspective view of the screening arrangement of Fig. 1 in another position,

Fig. 5 is a perspective view of a top element of Fig. 1-4,

Fig. 5B schematically shows a cord loop for tilting the slats in a screening arrangement according to the invention,

Fig. 6 shows a detail of a top element,

Fig. 6B shows a mechanically simple embodiment according to the invention,

Fig. 7 is a bottom view of a top element according to the invention,

Fig. 8 is a perspective view of a tilt assembly according to the invention,

Fig. 9 shows a detail of a the tilt assembly of Fig. 8,

Fig. 10 shows another detail of the tilt assembly of Fig. 8,

Fig. 11 is a top view of Fig. 9,

Fig. 11B is a top view of Fig. 8,

Fig. 12 is a perspective top view of Fig. 10,

Fig. 12B shows a detail of a preferred embodiment of the invention,

Fig. 13 is an example showing the use of the detail shown in Fig. 12B,

Fig. 14 is a further example showing the use of the detail shown in Fig. 12B,

Figs. 15A-15E show different positions of a tilt assembly according to the invention.

[0023] Figs. 1 to 4 show an embodiment of a screening arrangement generally designated 1. As shown in Fig. 1, the screening arrangement 1 is adapted to be mounted on a frame constituted by a sash 2 representing a window. The sash 2, in turn, is adapted to be connected with a stationary frame (not shown), which in a mounted position of the window lines an opening in a building. It is noted that the term "frame" is to be understood as incorporating any structure positioned in any opening in a building, whether in a wall or the roof, and surrounding an aperture to be screened. Although the sash shown in Fig. 1 is the sash of a roof window and the screening arrangement 1 is mounted on the sash 2 of the window, a screening arrangement 1 according to the invention may just as well be mounted on the stationary frame instead of the sash and may also be utilized in connection with e.g. windows having a frame only, or in doors. The sash 2 has a top piece 21, a bottom piece 22 and two side pieces 23 and 24 surrounding an aperture, which is covered by a suitable panel element such as a glazing in the form of an insulating pane (not shown).

[0024] In the embodiment shown, the screening arrangement 1 is a Venetian blind comprising a screening device 6 comprising a number of slats 80, tilt cords 81 and operating cords (not shown). At its upper end edge, the screening device 6 is fastened to a top element 4 by means of said tilt cords 81 and operating cords. Its opposed, lower end edge is fastened to the operating element 71. The operating element 71 and the slats 80 extend substantially in parallel to each other in a first longitudinal direction defining a width direction. The first lon-

gitudinal direction is substantially perpendicular to a second longitudinal direction defining a height direction. Thus, the width direction is parallel to the top and bottom pieces 21 and 22 and the height direction to the side pieces 23 and 24 of the sash 2.

[0025] The top element 4 is adapted to be positioned at the sash top piece 21 such that a top rail 440 of the top element 4 extends in the first longitudinal of width direction. Side rails 8, 9 are adapted to be positioned at the left-hand side piece 23 and right-hand side piece 24, respectively, to extend in the second longitudinal or height direction. The terms "left-hand" and "right-hand" refer to the orientation shown in for instance Figs 1 and 2 and are utilized for reasons of convenience only. Similarly, the terms "front" and "back" are utilized to denote the sides of the screening arrangement, "front" being the side intended to face inwards into the room of the building, and "back" the outwards facing side.

[0026] The top rail 440 has two ends, which in the embodiment shown are mitred, and of which the left-hand mitred end 445 and the right-hand mitred end 446 are indicated in Fig. 5. The mitred ends 445, 446 are adapted to be joined to a respective mitred end of the side rails 8, 9. The top rail 440 is joined to the side rails 8, 9 in joints by means of angular brackets 85. Opposite ends of the operating element 71 are introduced into these side rails 8 and 9. Furthermore, each end of the top element 4 has an end piece 450 with a resilient portion 451, which end piece is adapted to engage with respective bracket member (not shown) mounted on opposing sides of a sash or a frame.

[0027] In the embodiment shown, the operating element 71 is adapted to act as a handle during operation of the screening arrangement 1, i.e. for moving the operating element 71 and hence the slats 80 between a non-screening position and a screening position corresponding to the positions shown in Fig. 2 and Fig. 4, in which the screening device 6 covers the sash aperture partly or fully. However, instead of being manually operated, the screening arrangement may be operated by other means, e.g. by electrical operating means.

[0028] In a typical embodiment the tilt cords 81 of the screening device 6 each comprises a first and a second cord connected by a plurality of vertically-spaced cross-rungs, which first and second cords in a condition of use extends in the above-mentioned height direction. The slats 80 of the screening device 6 are each supported on one of said cross-rungs between said first and second cords of the tilt cords 81. The slats 80 may also be placed between two close-set cross-rungs or they may also be mounted directly to the vertical portions of the tilt cords 81. The top element 4 comprises an adjusting mechanism in connection with the cords 81 for commonly pivoting each of said slats 80 about their longitudinal direction, which in a condition of use corresponds to the above-mentioned width direction. By moving said first and second cords of the tilt cords in vertically opposite directions, respective first and second screening surfaces of the slats 80 may be tilted to face either the front or back as defined above. Hence, in typical embodiments of such screening arrangement 1 the slats 80 may be tilted 180 degrees.

[0029] Fig. 5 is a perspective front view of a top element 4 comprising two tilt assemblies 460. Each tilt assembly 460 comprises a first tilt assembly 470 (cf. Fig. 6) and second tilt assembly 480 (cf. Fig. 8), which are to be explained in more detail below. Furthermore is shown a portion of a cord loop 90 connected to said tilt assemblies 460, which cord loop 90 in a preferred embodiment is directly connected to a handle 10 positioned on one of said side rails 8, 9. In the embodiment shown, a cord loop wheel 95 at the left-hand side of the top element serves a turning point of the cord loop 90.

[0030] Fig. 5B shows the direct connection between the handle 10 and the tilt assemblies 460 accommodated in the top element 4. The loop wheel 95 in the upper left corner of the screening arrangement 1 and a corresponding loop arrangement near the bottom sash piece 22, constitute in a manner known per se, the turning points of the cord loop 90. As shown in Fig. 5B the cord loop 90 is adapted to extend from the cord loop wheel 95 at the left-hand upper corner of the top element 4, along the top element 4 and the side rail 9 to the right-hand lower corner of the sash. In the mounted position, the cord loop 90 is hidden behind the side rails 8, 9. Alternatively, the cord loop 90 could be divided in two with first portion extending along the side rails 8, 9 to a transmission in the top element, which connects to a second portion of the cord loop, which extends along the top element 4.

[0031] Fig. 6 shows a portion of the tilt assemblies 460 in a preferred embodiment of the invention, wherein the first assembly member is a rotatory wheel 470. Each vertically extending cord of the tilt cords 81 of the screening device 6 are connected (not shown) to said rotatory wheels 470, respectively. The rotatory wheels 470 have an axis of rotation, which is substantially parallel to the height direction of the top element 4. The tilt cords 81 of the screening device 6 are guided through respective elongate apertures 486 of a supporting bottom portion 485 of the top element 4 and connected to tilt assemblies 460 serving each tilt cord 81, respectively. The supporting bottom portion 485 may be adapted to accommodate and form a support for said rotatory wheels 470 as shown in Fig. 6. However, as shown in Fig. 8 in another embodiment, each tilt assembly 460 may further comprise a support portion 490 adapted to fit into the top element 4. The support portion 490 comprises an elongate aperture 496 corresponding to the elongate aperture of the bottom support portion 485 of the top element 4. The support portion 490 is also adapted to receive and support a rotatory wheel 470 as a first assembly member and a second assembly member 480, which second member 480 in the shown embodiment is a plate having a first upper side 481 and a second lower side 482 comprising a first and a second track 483, 484. The support portion 490 is provided with first and second sidewalls 495, 497, adapt-

ed to guide the second assembly member 480 in the longitudinal direction of the top element 4. Evidently, the features of the support portion 490 may be an integral part of the top element 4. Furthermore, the second assembly member 480 is adapted to engage with and thereby rotate the first assembly member when the second assembly member is moved in the longitudinal direction of the top element 4. The apertures 486 and 491 of the top element and the tilt assembly 460, respectively, are rounded with a diameter that reduces wear and tear of the tilt cords 81 during operation. Moreover, the size of the apertures 486, 491 are adapted to make it possible to introduce the first assembly member 470 through the apertures after the tilt cords 81 have been mounted to the first assembly member 470, which further facilitates the assembling of the screening arrangement 1.

[0032] In a preferred embodiment the first assembly member is a rotatory wheel 470 comprising an at least partly circumferential recess 471 for accommodating a portion of said tilt cords 81. However, the tilt cord 81 may be connected directly to the first assembly member without the use of a recess. The slats 80 are tilted by rotating the rotatory wheels 470 connected to the tilt cords 81, which will pull the first and second cords of the tilt cord 81, respectively. Hence, a rotation of 180 degrees of the first tilt assembly 470 corresponds to a rotation of 180 degrees of the slats 80.

[0033] Fig. 6B shows another embodiment of the invention wherein the lever arm 20 is mounted on a tilt assembly 460, which is slidable in the longitudinal direction of the top element 4. The tilt assemblies 460 are directly connected to the tilt cords 81 (not shown) in a manner known per se, and by sliding the tilt assembly 460 in the longitudinal direction of the top element 4, the slats 80 of the screening device 6 may be tilted.

[0034] Fig. 9 is a view according to fig. 8 wherein the second assembly member 480 has been removed. The rotatary wheel 470 comprises two pins 473, 474 on an upper surface 475 facing away from the bottom portion 485 of the support portion 490 of the tilt assembly 460. Said pins 473, 474 are adapted to engage with first and second tracks 483, 484 provided on the lower side 482 of a second assembly member 480. When the second assembly member 480 is positioned between the side walls 495, 497 with the lower side 482 comprising tracks 483, 484 facing towards the support portion 490 and the pins 473, 474 of the rotatory wheel 470 engages with the tracks 483, 484, the rotatory wheel 470 is rotated by moving the second assembly member 480 in the longitudinal direction of the tilt assembly as indicated by the arrows A of Fig. 8. The tracks 483, 484 on the lower side 482 of the second assembly member 480 are further illustrated in Fig. 10.

[0035] As shown in the embodiment of Fig. 5 the second assembly member 480 may be moved in the longitudinal direction by means of a cord loop 90 connected to a handle 10 mounted to and slidable along a side rail 8, 9. However, instead of being manually operated the tilt assembly 460 may be operated by other means, e.g. by electrical operating means accommodated in the top element 4. In general the second assembly member 480 may be moved between a first and a second end position corresponding to the rotation of the slats 80.

[0036] Fig. 11 is a top view of Fig. 9 showing the position of the pins 473, 474 with respect to the sidewalls 495, 497 in a preferred embodiment. The position of the pins 493, 494 in Fig. 11 corresponds to the end position of the second assembly member as shown in Figs. 8 and 11B. The end positions of the second assembly member may be defined by end stops in the top element or in the bottom portion 490 of the tilt assembly 460 such as protrusions 492, 494, which may engage with a portion of the second assembly member 480. It is also possible to use either of the tracks as means for providing an end position of the second assembly member 480. This could for instance be made as shown in Fig. 15E, where the end point of the track 484 serves as a end stop for pin 474. In an embodiment wherein the tilt assembly 460 is not an integral part of the top element 4, the tilt assembly may be mounted in the top element 4 by means of a snap connection, which provides for a facilitated production. In a preferred embodiment, snap pins extending from each corner of the support portion 490 provide the snap connection.

[0037] Fig. 12 is a perspective view of the second assembly member 480 having a lever arm 20 pivotally connected to the second assembly member 480. The lever arm 20 is pivotal between two walls 485, 486 of the upper side 481 of the second assembly member 480 with respect to a pivot 30. In the illustrated embodiment the lever arm is U-shaped and comprises a first arm 21 and a second arm 22, both extending from the pivot 30. The first arm 21 extends on the upper surface 481 of the second assembly member 480, whereas the second arm 22 extends through an aperture 487 to the lower side 482 of the second assembly member 480. A pin 25 extends substantially perpendicular from the second arm 20. As shown in Fig. 12B, which is a side view of a preferred embodiment of a lever arm 20, the second arm 22 extends in a L-shaped fashion from the pivot 30 into the pin 25 and thereby forms a U-shaped recess 35 of the lever arm 20. As shown in Fig. 13 the lever arm 20 is adapted to receive the cord in the recess 35, which is adapted to squeeze said cord slightly when it has been positioned in the recess 35. When pulling the cord, which preferably is a part of a cord loop 90, the lever arm 20 will pivot from the position shown in Fig. 13 towards the position in Fig. 12 and thereby the cord will be squeezed further between the either of the walls 485, 486 and the pivot 30, depending on the direction in which the cord is pulled. Hence, due to the inherent friction between the recess 35 and the cord, which preferably is a part of a cord loop 90, the second assembly member 480 is mounted in a top element 4 it can be moved with respect to the longitudinal direction of the top element 4 by pulling the cord. Preferably the wall of the U-shaped recess 35 facing the pivot

30 is substantially crescent with a substantially sharp edge on each side of the lever arm 20. Hence, when pulling the cord and moving the lever arm 20 either of the sharp edges will squeeze into the cord positioned in the recess 35 and fix it between a portion of the upper side 481 of the second assembly member 480 and said sharp edges.

[0038] Basically, the locking mechanism of the second assembly member 48 must have a recess or a bore adapted to receive a cord and provide a resistance to the cord when it is pulled and preferably the pull resistance is increased when the cord is pulled.

[0039] In another embodiment the second assembly member 480 is provided with a tubular element substantially extending in the longitudinal direction of the top element 4. A cord is pulled through a through-going bore of the tubular element, which hole is slightly smaller than the diameter of the cord in order to obtain a friction between the tubular element and the cord.

[0040] In yet another embodiment the cord is connected to the second assembly member 480 by means of a ball bearing and a ball mounted on said assembly member 480. The ball is pushed towards the ball bearing by a spring and the cord is guided between the ball and the ball bearing in order to provide the friction required for moving the assembly member 480.

[0041] When the second assembly member 480 reaches an end position, the cord may be pulled through the through-going bore or between the ball bearing and the spring loaded ball, which provides for a flexible positioning of the handle 10.

[0042] However, when the tilt assembly 460 of a screening arrangement 1 is operated by means of handle 10 positioned on a side rail 8, 9 as shown in Figs. 1-4, it is desirable with a flexible positioning of the handle 10 on the side rails 8, 9. This is especially the case when a screening arrangement 1 is used in connection with a roof window and users of different height must operate the handle 10.

[0043] As shown in Fig. 9 and 11 the support portion 490 comprises two end stop pins 492, 494 in connection with end walls 496 of the support portion 490. The end stop pins 492, 494 are adapted as respective end positions when moving the second assembly member 480 with respect to the longitudinal direction of a top element 4. As described above the support portion 490 and said end stop pins 492, 494 may be an integral part of the top element 4. In a preferred embodiment the cord connected to the second assembly member is a part of a cord loop 90 as illustrated in Fig. 5. When the cord loop 90 of the is pulled and the second assembly member 480 moves, pin 25 of lever arm 20 will eventually reach one of said end stop pins 492, 494. As shown in Fig. 14 the pin 25 of the lever arm 20 protrudes in a recess 30 on the lower side 482 of the second assembly member 480. Therefore when the lever arm 20 reaches an end stop pin 492, 494 the second assembly member reaches an end position. Pulling the cord loop 90 further towards an end stop pin 492, 494 will pivot the lever arm 20 to a position as shown in Fig. 5 and 13. In this position the cord loop 90 is only slightly squeezed by the lever arm 20 and the second assembly member 480 is stopped in an end position until the cord loop 90 is pulled in another direction. Hence, the pins 492, 494 define respective end positions for the movement of the second assembly member 480. If the cord 90 is pulled further in the same direction after the second assembly member 480 reach an end stop pin 492, 494, the cord loop 90 can be pulled further by means of the handle 10 without moving the second assembly member 480. Thereby it is possible to move the handle 10 further in the same direction after the second assembly member 480 has reached an end position and thereby adjust the position of the handle 10 in order to fit the operating position to the individual user. In a typical embodiment the cord loop 90 is provided by a cord having its two end connected to the handle 10 of the screening arrangement. The cord loop 90 may be divided in two parts having a first part extending in the longitudinal direction of a side rail 8, 9 and having it ends connected to the handle 10. The first part of the cord loop takes a turn in the top element 4 and at the opposite end of the side rail 8, 9. In the top element 4 the first part of the cord loop is connected to a transmission, which may comprise a gearing. A second part of the cord loop connected to the tilt assembly 460 extends in the longitudinal direction of the top element 4 and takes a turn at a cord loop wheel 95 and in said transmission. The use of a cord loop 90 divided in two parts may provide for a facilitated installation of the screening arrangement 1 and the use of a transmission with a gearing makes it possible to further adjust the relation between a movement of the handle 10 and the rotation of the slats 80.

[0044] Normally, a screening arrangement 1 comprises two or more tilt assemblies 460, which must operate on the tilt cords 81 simultaneously. When the tilt assemblies 460 are connected with a cord loop 90, which on the other hand is connected to the tilt assemblies 460 with a lever arm 20 functioning as described above, the operating position of the tilt assemblies 460 will automatically be synchronised as the handle 10 is moved along the side rail 9. Hence, a screening arrangement according to the invention provides a very stable operation of the tilt cords 81 and any possible adjustment of the tilt mechanism of the screening arrangement 1 is made during normal operation, without any special interaction on the user.

[0045] Figs. 15A-15E illustrate how the pins 473, 474 of the rotatory wheel 470 engage with the tracks 483, 484 of the second assembly member 480 in a preferred embodiment. The position of the tilt assembly shown in Fig. 15A corresponds to an end position wherein the slats 81 of the screening device are tilted to an almost upright position wherein a screening surface of the slats 80 substantially are facing the aperture to be screened. In Fig. 15A the second pin 474 engages with the second track 484, but the rotatory wheel 470 is in a position wherein

the first pin 473 does not engage with the first track 483. When moving the second assembly member 480 towards the left hand side of Fig. 15A-15E, the walls of the tracks 483, 484 may in all positions apply a force to a least one the pins 473, 474 and thereby a counter-clockwise rotation of the rotatory wheel 470 is obtained.

[0046] In Fig. 15B both pins 473, 474 engage with the tracks 483, 484, respectively, and the rotatory wheel 470 has been rotated 60 degrees, which provides a corresponding rotation of the slats 80 of the screening device 6. In Fig. 15C the second assembly member 480 has been further moved to the left-hand side and the rotatory wheel 470 has been rotated 90 degrees in the counter-clockwise direction. This corresponds to a position of the slats 80 wherein the screening surfaces of the slats are substantially perpendicular to the aperture of the aperture to be screened.

[0047] The position of the rotatory wheel 470 shown in Fig. 15D is of special interest with respect to the preferred embodiment of the invention. In Fig. 15D the second pin 474 is in a position wherein the second track 484 alone cannot apply a force to the second pin 474 in order to further rotate the rotatory wheel 470 in the counter-clockwise direction. However, in this position the first track 483 can still apply a force to the first pin 473 in order move the second pin 474 beyond the position of Fig. 15D, which corresponds to a rotation of approximately 120 degrees. Experiments has shown that it is impossible to design a single track in the second assembly member 480, which can provide a 180 degree rotation of the rotatory wheel 470. Using two tracks 483, 484 is the preferred embodiment to overcome the above-mentioned dead point of Fig. 15D and to achieve a full rotation of the rotatory wheel 470 and thereby the slats 80 of 180 degrees, which is desirable for most screening arrangements. However, the same result could be achieved with a second assembly member having only one track, such as the second track 484, in combination a spring-loaded mechanism adapted to overcome said dead point. At all positions between those shown in Fig. 15A and Fig. 15E the second assembly member 480 can be moved back towards the right hand side and thereby rotate the rotatory wheel 470 in the clockwise direction.

[0048] In a preferred embodiment the tracks 483, 484 and the end positions of the tilt assembly 460 is adapted to provide a transmission between the handle 10 and the rotation of the slats so that if the handle 10 is moved approximately 10 centimetre along the side rail 9, the slats 80 are tilted 180 degrees.

[0049] Another advantage of the invention is that the tracks 483, 484 can take many other shapes, which may provide for different angular velocities of the slats when moving the handle 10 along the side rail 9. Hence, it is for example possible to design the tracks 483, 484 so that the handle 10 more easily can be used for fine tuning the tilt of the slats 80, when they are in a position as shown in Figs. 1-4, and when the slats 80 are tilted to a full screening position even a relatively small movement of the handle 10, will result is a relatively large rotation of the slats 80.

[0050] A further aspect of the preferred embodiment is the position of the first and second pins 473, 474 of the rotatory member 470 with respect to each other and with respect to how they are positioned in the end positions shown in Fig. 15A and 15E. In a preferred embodiment the pins 473, 474 are positioned on the upper surface 475 of the rotatory wheel 470 adjacent to the edge and they separated 90 degrees with respect to the axis of rotation. In the preferred embodiment the tracks 483, 484 of the second assembly member is designed so that the tracks 483, 484 do not cross each other. If the tracks 483, 484 cross each, the operation of the tilt assembly 460 may be less smooth, because the pins 473, 474 may get stuck is such a cross-section of the tracks 483, 484. To enable a design of the tracks 483, 484 where the tracks do not cross each other, the position of the first pin 473 may for instance be rotated 15 degrees with respect to the adjacent first and second sidewalls 495, 497, respectively, as shown in the end positions of Fig. 15A and 15E, and the two pins 473, 474 are separated by 90 degrees. This is further illustrated the angle a in Fig. 11, which corresponds to the end position of Fig. 15A. The separation of the pins 473, 474 by 90 degrees provides for an more even rotation of the first assembly member 470, because either of the tracks 483, 484 is able to contribute with a force to the pins 473, 474 in all positions of the first assembly member 470, when the second assembly member 480 is moved between its end positions corresponding to the end positions of the slats 81, and in most positions both tracks 483, 484 will apply a force to the pins 473, 474 and thereby contribute to a smooth rotation.

[0051] A similar transmission and engagement between the first assembly member 470 and the second assembly member 480 may be achieved by providing the second assembly member 480 with a plurality of pins or protrusions and the rotatory wheel 470 with a plurality of tracks or recesses adapted to engage with the pins or protrusions of the second assembly member 480. In the embodiment of Fig. 15A-E the first assembly member is shaped as a wheel. Evidently, the first assembly member 470 can take many other shapes than a wheel in order to provide a connection between the tilt cords 81 and the second assembly member 480. Furthermore, the invention is not limited to embodiments wherein the axis of rotation corresponds to a symmetry axis of the wheel 470 or a symmetry axis of any other suitable rotatory member 470.

[0052] In a further embodiment of the invention said first and second tracks 483, 484 are provided as elongate tongues, which engage with corresponding grooves provided on said pins 473, 474 and the pins are rotatable with respect to the rotatory member 470.

[0053] In yet a further embodiment of the invention the rotatory member 470 is provided with two further pins facing the top element 4, which is provided with two tracks

for receiving said two further pins. Hence, the rotatory member 470 can be positioned to be floating or freely embedded between the second assembly member 480 and the top element 4. Evidently, this embodiment could also be achieved by using elongate tongues and groves as described above.

[0054] The invention should not be regarded as limited to the embodiments shown and described in the above, but several modifications and combinations may be carried out without departing from the scope of the appended claims.

Claims

1. A screening arrangement (1) comprising:

a top element (4) having a longitudinal direction, which is adapted to be positioned along a longitudinal direction of a top piece (21) of a frame in a condition of use, and a height direction, which is adapted to be positioned along a longitudinal direction of a side piece of a frame in a condition of use,
a screening device (6) comprising a plurality of tiltable slats (80) adapted to at least partly screening an aperture of a frame, and a tilt cord (81) connected to said slats (80) and a tilt assembly (460) accommodated in said top element (4) and being movable in the longitudinal direction of said top element (4) between a first and a second end position,
an operating cord (90) extending in the longitudinal direction inside said top element (4) and connected to said tilt assembly (460) for tilting said slats (80) between a first and a second predetermined position,
said tilt assembly (460) comprises a locking mechanism (20) adapted to connect said operating cord (90) to said tilt assembly (460),
said locking mechanism (20) has a locking condition allowing said operating cord (90) to move said tilt assembly between said first and second end positions, and an unlocking condition wherein said operating cord (90) is movable in said longitudinal direction of said top element (4) without moving said tilt assembly, **characterized in that**
said locking mechanism (20) is a lever arm (21) being movable between two end positions and wherein said locking condition is achieved in said end positions, and **in that**
a longitudinal direction of said lever arm (21) in said unlocking condition is substantially perpendicular to the longitudinal direction of said top element (4).

2. A screening arrangement (1) according to claim 1, wherein said first and second end positions of said tilt assembly (460) is adapted to move said lever arm (21) to said unlocking condition.

3. A screening arrangement (1) according to claim 1 or 2, wherein said lever arm (21) comprises a pin (25) adapted to move said lever arm (21) to the unlocking condition when said tilt assembly (460) is moved to said first and second end positions.

4. A screening arrangement (1) according to any previous claim, wherein said locking mechanism (460) comprises a recess or a bore adapted to receive said operating cord (90) and to provide a pull resistance when pulling said operating cord (90).

5. A screening arrangement according to claim 4, wherein the pull resistance is increased when said operating cord (90) is pulled.

6. A screening arrangement (1) according to claim 4 or 5, wherein the recess comprises a substantially sharp edge for squeezing the operating cord (90) between a portion of the locking mechanism (20) and the tilt assembly (460).

7. A screening arrangement (1) according to any previous claim, further comprising two side rails (8, 9) adapted to be positioned on side pieces of a frame and wherein at least one of said side rails comprises an operating handle (10) in connection with said operating cord (90).

Patentansprüche

1. Abschirmanordnung (1) mit
einem oberen Element (4) mit einer Längsrichtung, die angepasst ist, in einer Benutzungsstellung entlang einer Längsrichtung eines oberen Teils (21) eines Rahmens angeordnet zu werden, und mit einer Höhenrichtung, die angepasst ist, in einer Benutzungsstellung entlang einer Längsrichtung eines Seitenteils eines Rahmens angeordnet zu werden,
einer Abschirmeinrichtung (6), die eine Vielzahl von verschwenkbaren Lamellen (80) aufweist, die angepasst sind, zumindest teilweise eine Öffnung in einem Rahmen abzuschirmen, und mit einer Schwenkschnur (81), die mit den Lamellen (80) verbunden ist, und einer Schwenkanordnung (460), die in dem oberen Element (4) aufgenommen und in der Längsrichtung des oberen Elements (4) zwischen einer ersten und einer zweiten Endstellung bewegbar ist,
einer Betätigungsschnur (90), die sich in der Längsrichtung in dem oberen Element (4) erstreckt und mit der Schwenkanordnung (460) zum Schwenken der Lamellen (80) zwischen einer ersten und einer zwei-

ten vorgegebenen Stellung verbunden ist,
wobei die Schwenkanordnung (460) einen Verriegelungsmechanismus (20) aufweist, der angepasst ist, die Betätigungsschnur (90) mit der Schwenkanordnung (460) zu verbinden,
wobei der Verriegelungsmechanismus (20) eine Verriegelungsstellung hat, die der Betätigungsschnur (90) ermöglicht, die Schwenkanordnung zwischen der ersten und der zweiten Endstellung zu bewegen, und eine entriegelte Stellung, wobei die Betätigungsschnur (90) in der Längsrichtung des oberen Elements (4), ohne die Schwenkanordnung zu bewegen, beweglich ist, **dadurch gekennzeichnet, dass**
der Verriegelungsmechanismus (20) ein Hebelarm (21) ist, der zwischen zwei Endstellungen beweglich ist, und wobei die Verriegelungsstellung in den Endstellungen erreicht wird, und dass
eine Längsrichtung des Hebelarms (21) in der entriegelten Stellung im Wesentlichen senkrecht zu der Längsrichtung des oberen Elements (4) ist.

2. Abschirmanordnung (1) nach Anspruch 1, wobei die erste und die zweite Endstellung der Schwenkanordnung (460) angepasst sind, den Hebelarm (21) in die entriegelte Stellung zu bewegen.

3. Abschirmanordnung (1) nach Anspruch 1 oder 2, wobei der Hebelarm (21) einen Stift (25) aufweist, der angepasst ist, den Hebelarm (21) in die entriegelte Stellung zu bewegen, wenn die Schwenkanordnung (460) in die erste und zweite Endstellung bewegt wird.

4. Abschirmanordnung (1) nach einem der vorhergehenden Ansprüche, wobei der Verriegelungsmechanismus (460) eine Aussparung oder eine Bohrung aufweist, die angepasst sind, die Betätigungsschnur (90) aufzunehmen und einen Zugwiderstand vorzusehen, wenn die Betätigungsschnur (90) gezogen wird.

5. Abschirmanordnung nach Anspruch 4, wobei der Zugwiderstand erhöht wird, wenn die Betätigungsschnur (90) gezogen wird.

6. Abschirmanordnung (1) nach Anspruch 4 oder 5, wobei die Aussparung eine im Wesentlichen scharfe Kante zum Quetschen der Betätigungsschnur (90) zwischen einem Abschnitt des Verriegelungsmechanismus (20) und der Schwenkanordnung (460) aufweist.

7. Abschirmanordnung (1) nach einem der vorhergehenden Ansprüche, ferner mit zwei Seitenschienen (8, 9), die angepasst sind, an Seitenteilen eines Rahmens angeordnet zu werden, wobei wenigstens eine der Seitenschienen einen Betätigungshebel (10) in Verbindung mit der Betätigungsschnur (90) aufweist.

Revendications

1. Dispositif d'occultation (1) comprenant :

un élément supérieur (4) présentant une direction longitudinale, lequel est adapté pour être positionné selon une direction longitudinale d'une partie supérieure (21) d'un cadre dans une situation d'utilisation, et présentant une direction de hauteur, lequel est adapté pour être positionné selon une direction longitudinale d'une partie latérale d'un cadre dans une situation d'utilisation,
un dispositif d'occultation (6) comportant une pluralité de lames inclinables (80) conçues pour occulter, au moins partiellement, l'ouverture d'un cadre, et un cordon d'inclinaison (81) raccordé aux dites lames (80) et à un dispositif d'inclinaison (460) logé dans ledit élément supérieur (4) et pouvant se déplacer dans la direction longitudinale dudit élément supérieur (4) entre une première et une seconde positions d'extrémité,
un cordon de manoeuvre (90) s'étendant dans la direction longitudinale à l'intérieur dudit élément supérieur (4) et raccordé au dit dispositif d'inclinaison (460) pour incliner lesdites lames (80) entre une première et une seconde positions prédéterminées,
ledit dispositif d'inclinaison (460) comporte un mécanisme de blocage (20) conçu pour connecter ledit cordon de manoeuvre (90) au dit dispositif d'inclinaison (460),
ledit mécanisme de blocage (20) possède une situation de blocage permettant au dit cordon de manoeuvre (90) de déplacer ledit dispositif d'inclinaison entre lesdites première et seconde positions d'extrémité, et une situation de déblocage dans laquelle ledit cordon de manoeuvre (90) peut se déplacer suivant ladite direction longitudinale dudit élément supérieur (4) sans déplacer ledit dispositif d'inclinaison, **caractérisé en ce que**
ledit mécanisme de blocage (20) est un bras de levier (21) pouvant se déplacer entre deux positions d'extrémité et dans lequel ladite situation de blocage est obtenue dans lesdites positions d'extrémité, et **en ce que**
une direction longitudinale dudit bras de levier (21) dans ladite situation de déblocage est essentiellement perpendiculaire à la direction longitudinale dudit élément supérieur (4).

2. Dispositif d'occultation (1) selon la revendication 1,

dans lequel lesdites première et seconde positions d'extrémité dudit dispositif d'inclinaison (460) sont adaptées pour déplacer ledit bras de levier (21) vers ladite situation de déblocage.

3. Dispositif d'occultation (1) selon la revendication 1 ou 2, dans lequel ledit bras de levier (21) comporte une broche (25) conçue pour déplacer ledit bras de levier (21) vers la situation de déblocage lorsque ledit dispositif d'inclinaison (460) est déplacé vers lesdites première et seconde positions d'extrémité.

4. Dispositif d'occultation (1) selon l'une quelconque des revendications précédentes, dans lequel ledit mécanisme de blocage (460) comporte un évidement ou un alésage adapté pour recevoir ledit cordon de manoeuvre (90) et pour fournir une résistance au tirage lorsqu'on tire ledit cordon de manoeuvre (90).

5. Dispositif d'occultation selon la revendication 4, dans lequel la résistance au tirage est augmentée lorsque ledit cordon de manoeuvre (90) est tiré.

6. Dispositif d'occultation selon la revendication 4 ou 5, dans lequel l'évidement comporte un bord essentiellement saillant pour comprimer le cordon de manoeuvre (90) entre une partie du mécanisme de blocage (20) et le dispositif d'inclinaison (460).

7. Dispositif d'occultation (1) selon l'une quelconque des revendications précédentes, comportant, de plus, deux rails latéraux (8, 9) adaptés pour être positionnés sur des parties latérales d'un cadre et dans lequel au moins l'un desdits rails latéraux comprend une poignée d'actionnement (10) en liaison avec ledit cordon de manoeuvre (90).

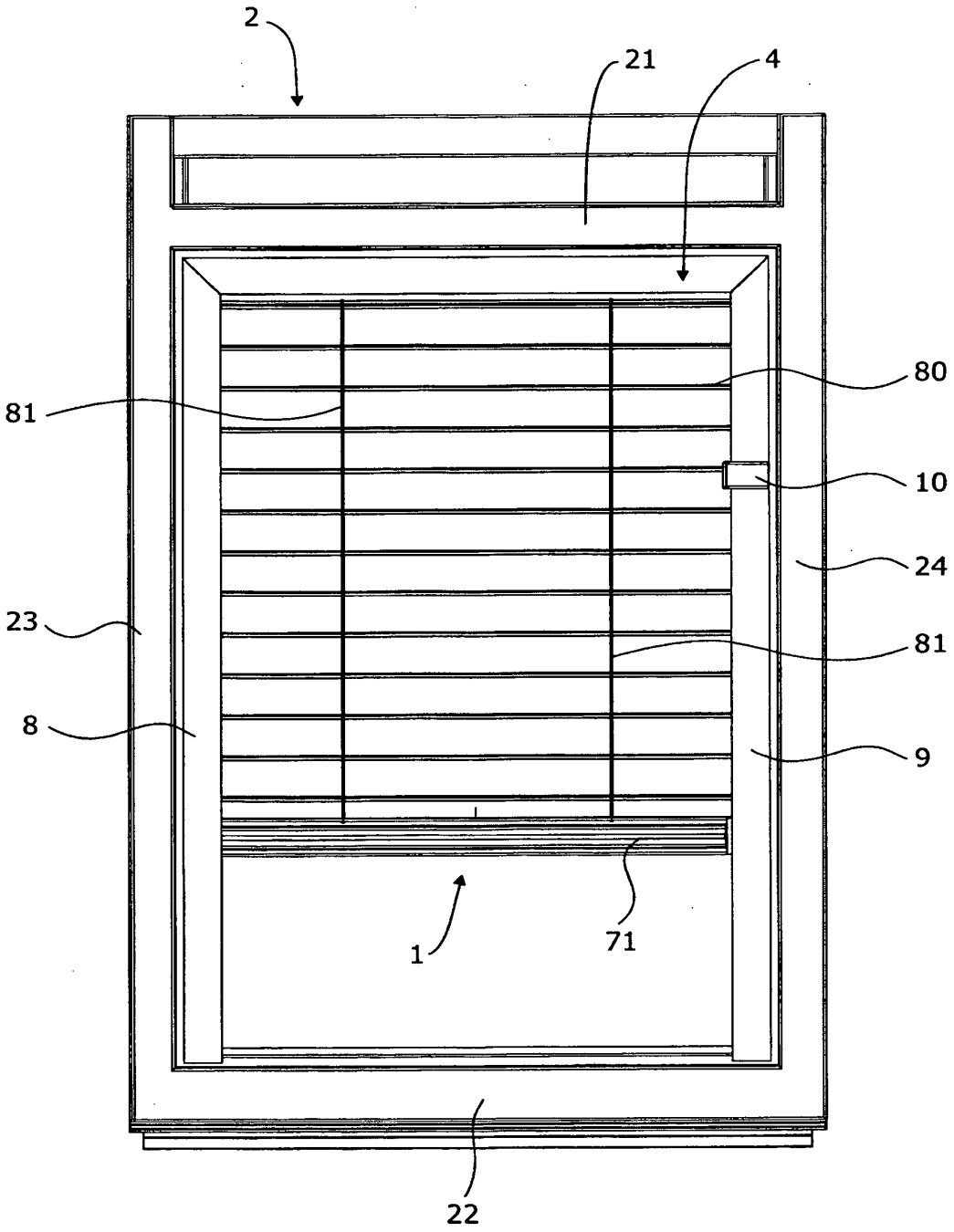

Fig. 1

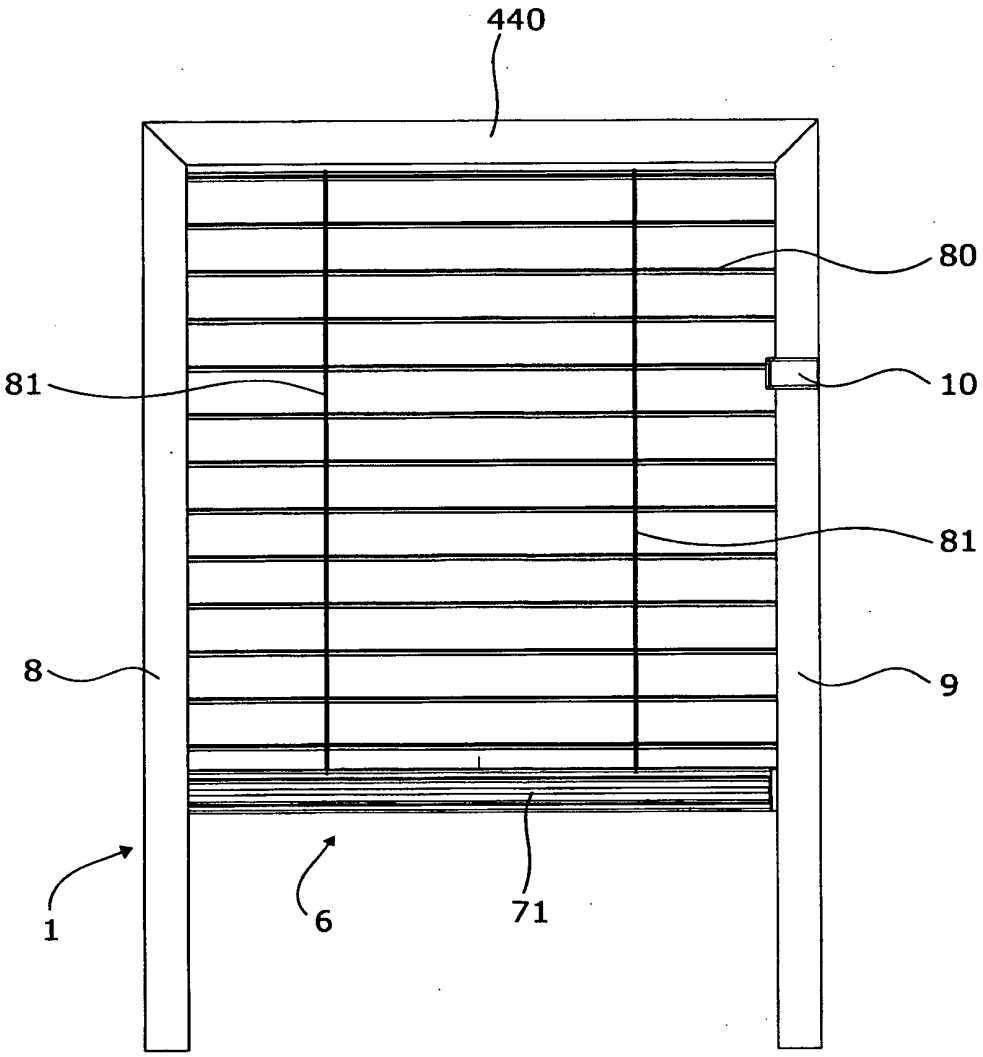

Fig. 2

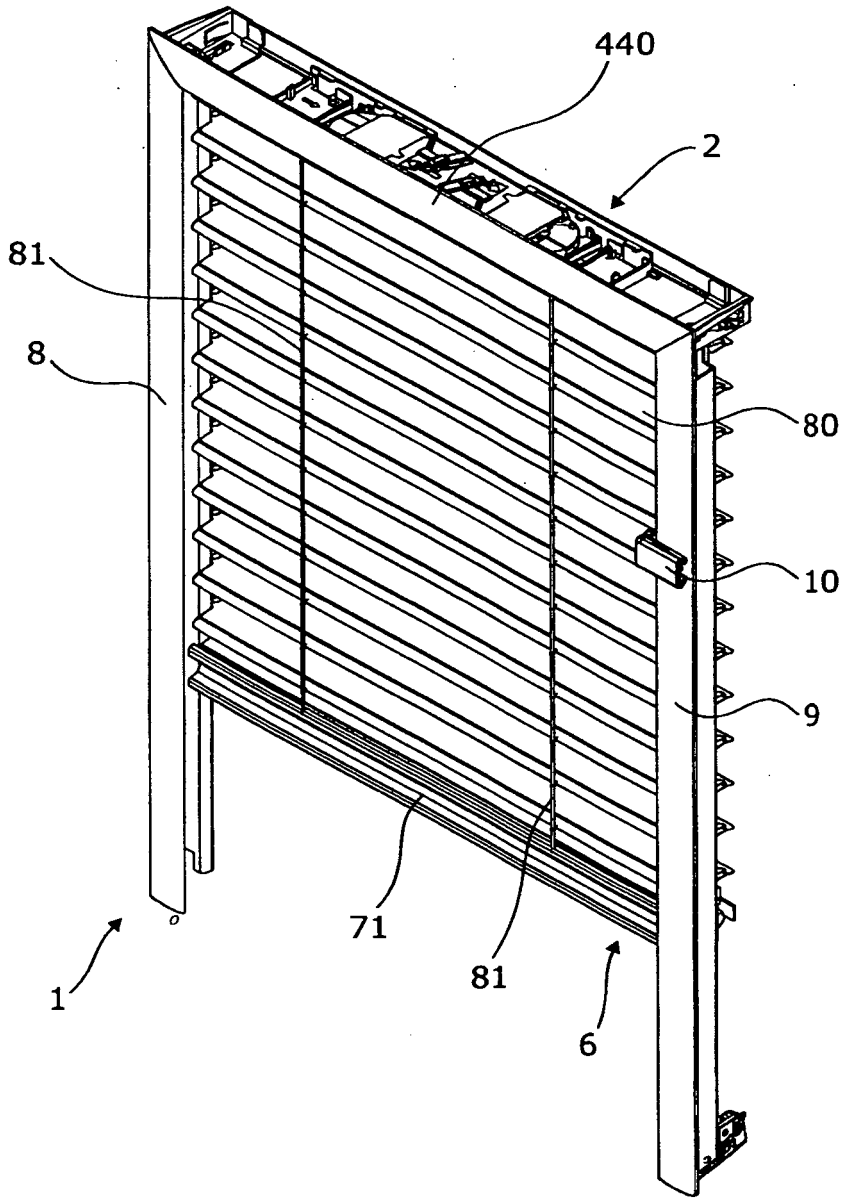

Fig. 3

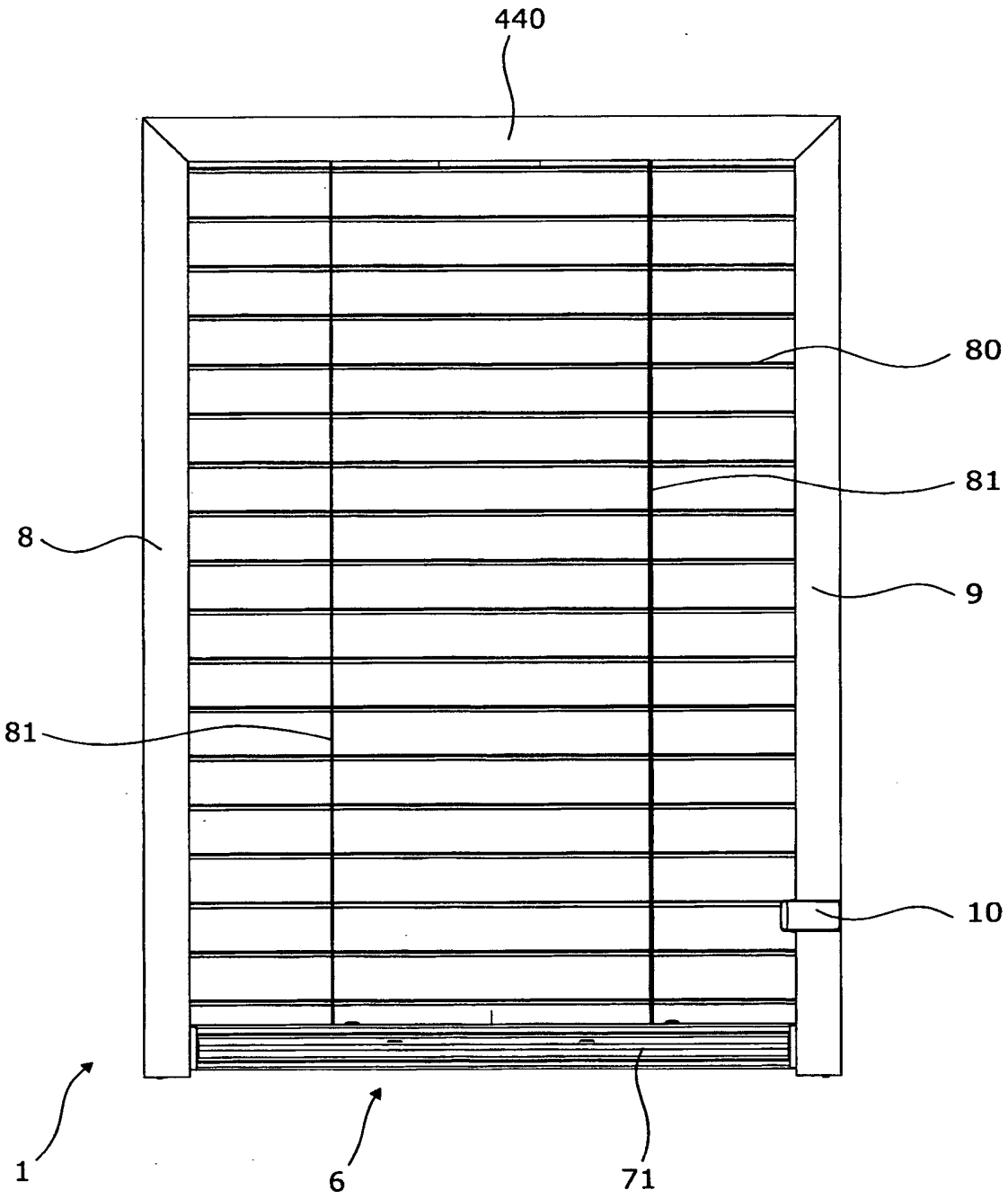

Fig. 4

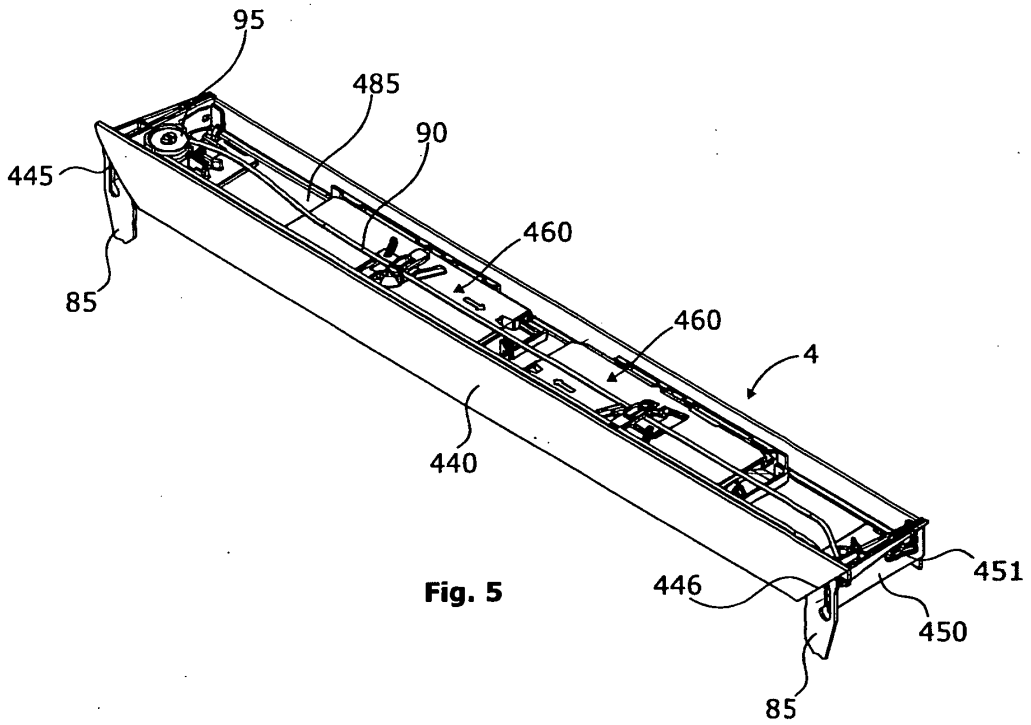
95
485
90
445
460
85
460
4
440
451
446
450
85

Fig. 5

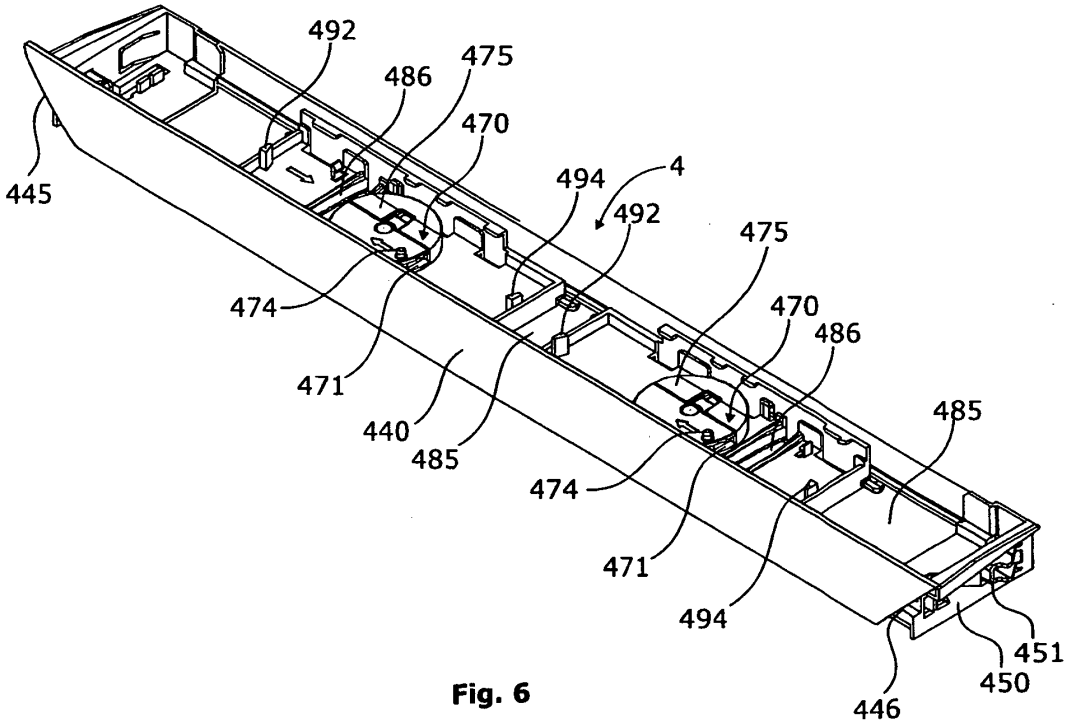
492
475
486
470
445
494
4
492
475
474
470
486
471
440
485
485
474
471
494
451
450
446

Fig. 6

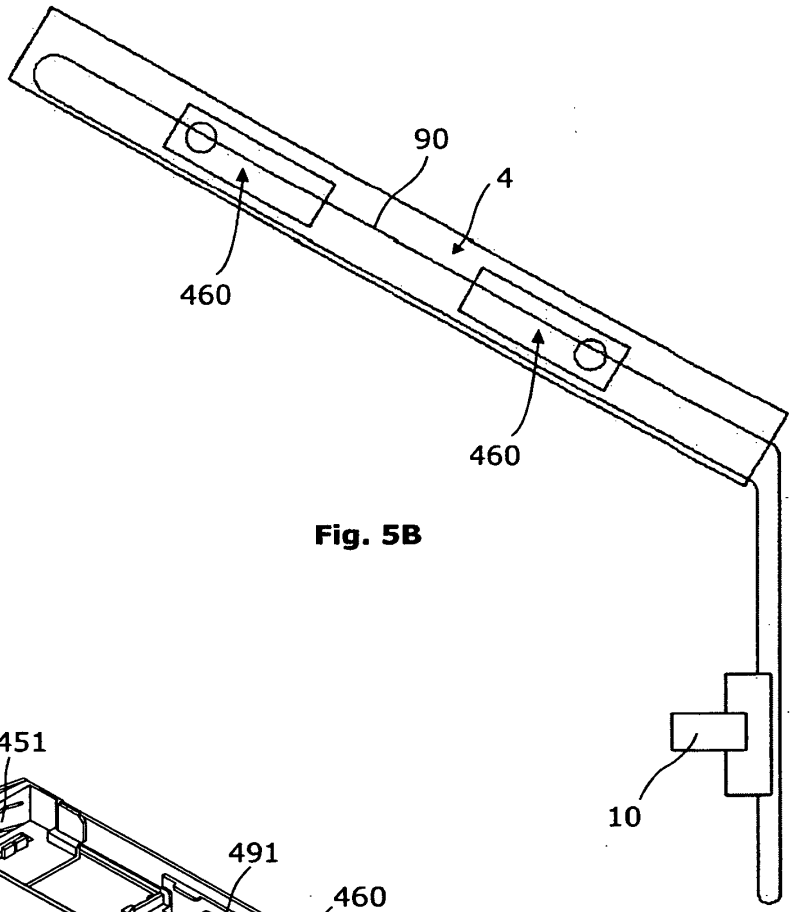

Fig. 5B

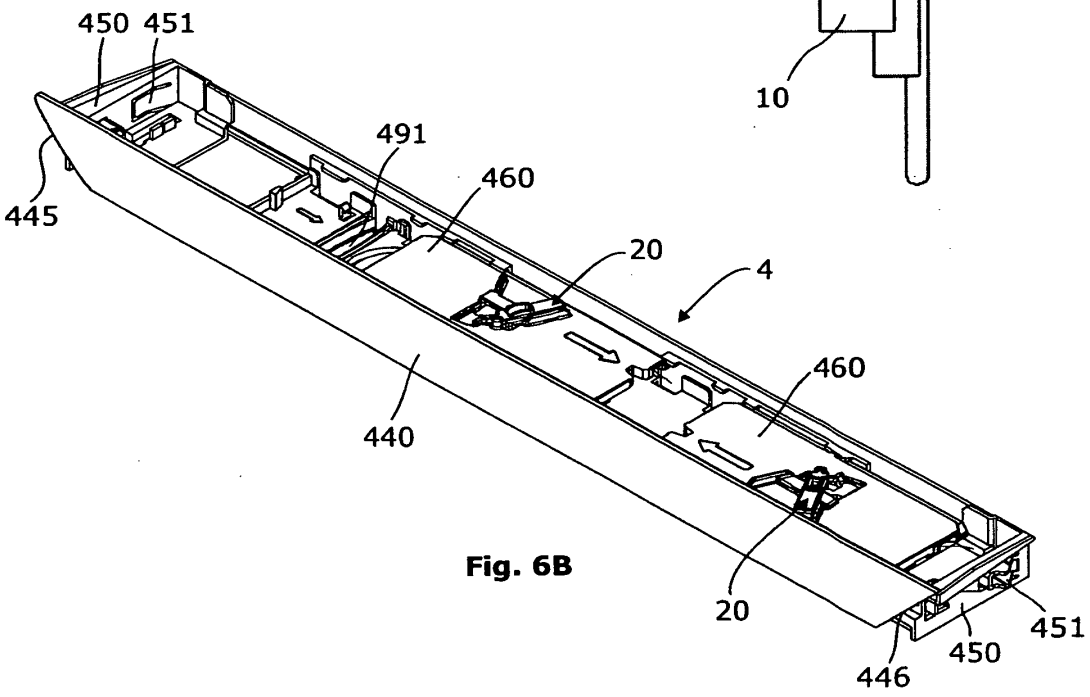

Fig. 6B

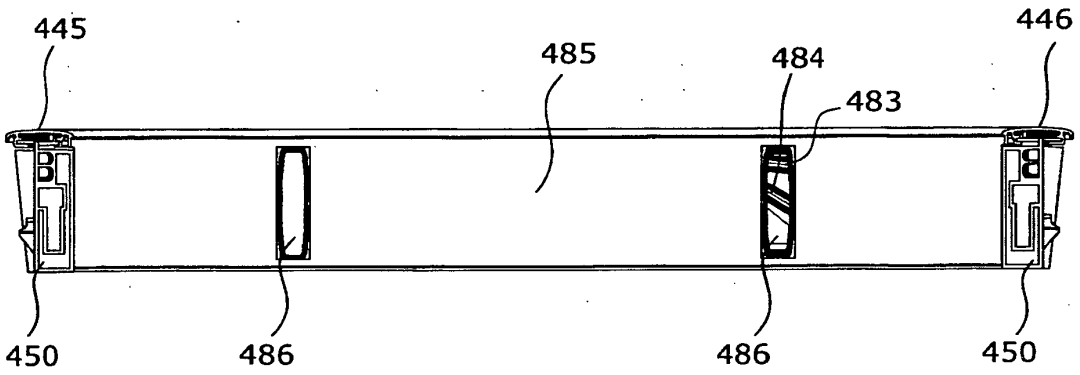
445
485
484
446
483
450
486
486
450

Fig. 7

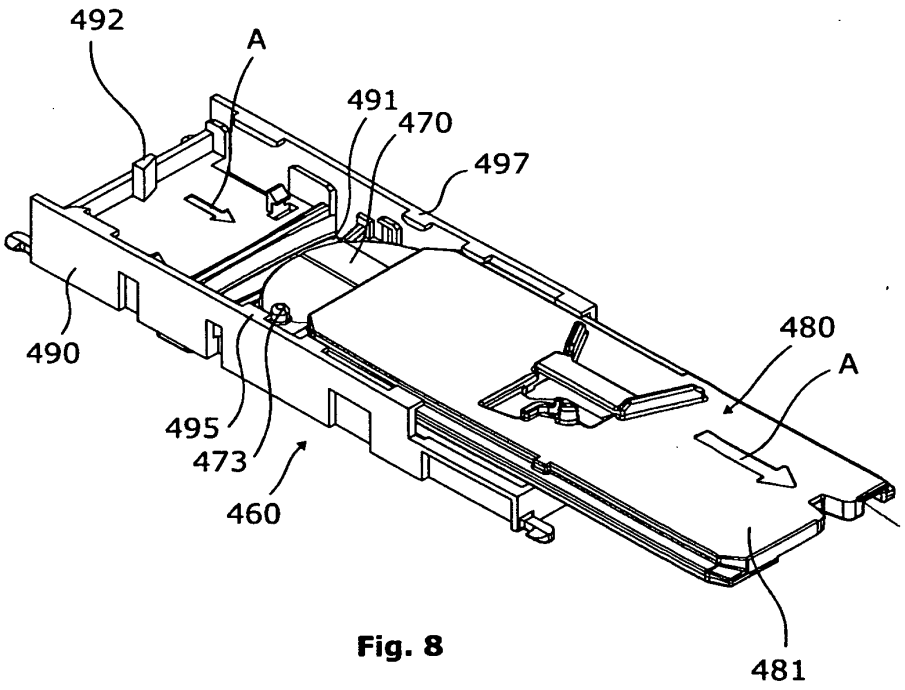
492
A
491
470
497
490
480
A
495
473
460
481

Fig. 8

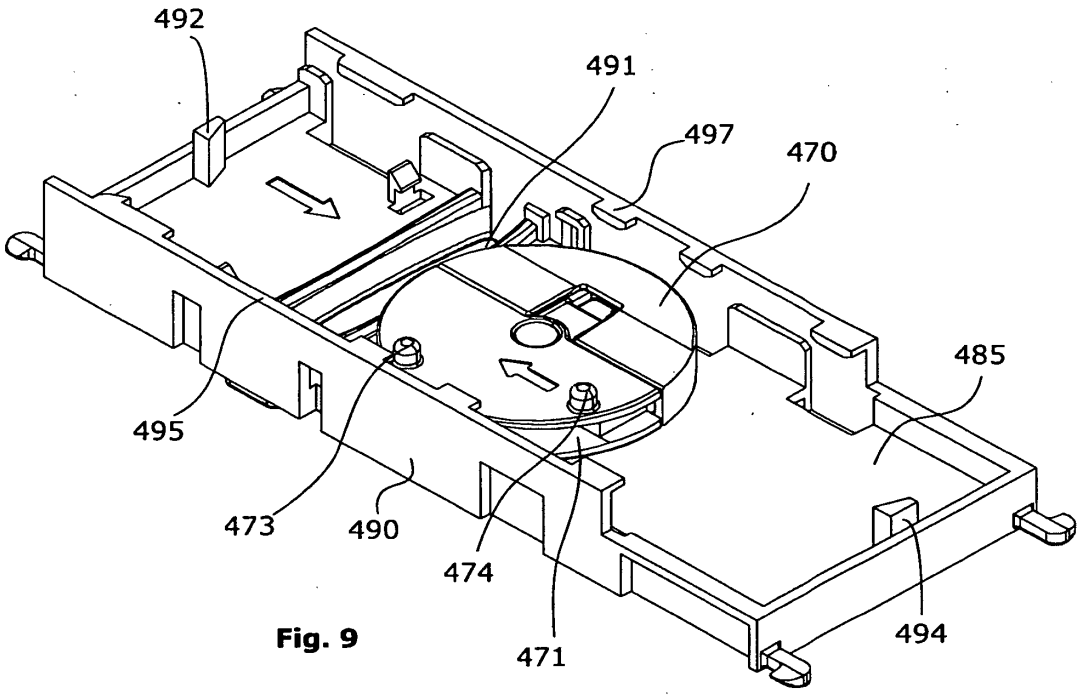
492
491
497
470
485
495
473
490
474
471
494

Fig. 9

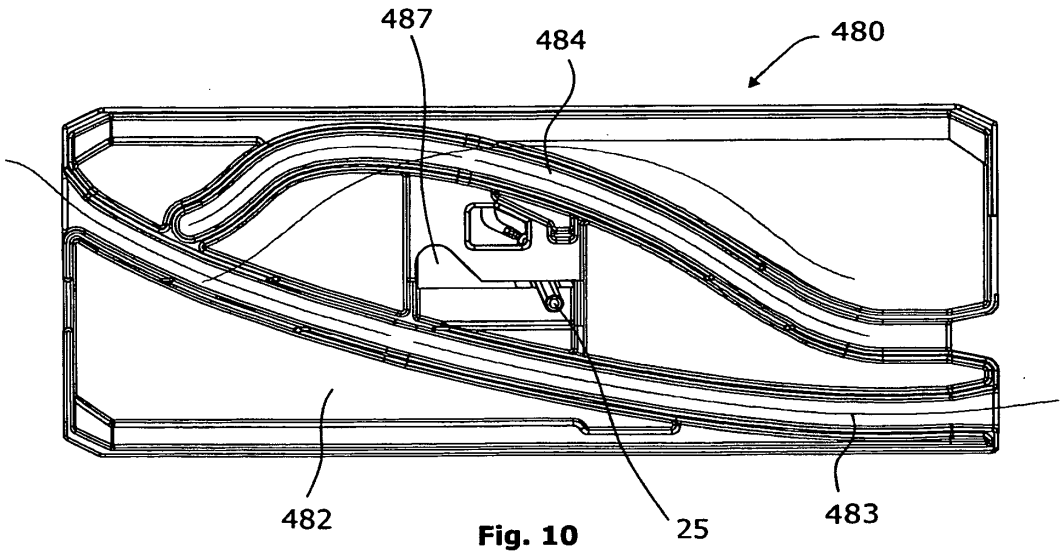
487
484
480
482
25
483

Fig. 10

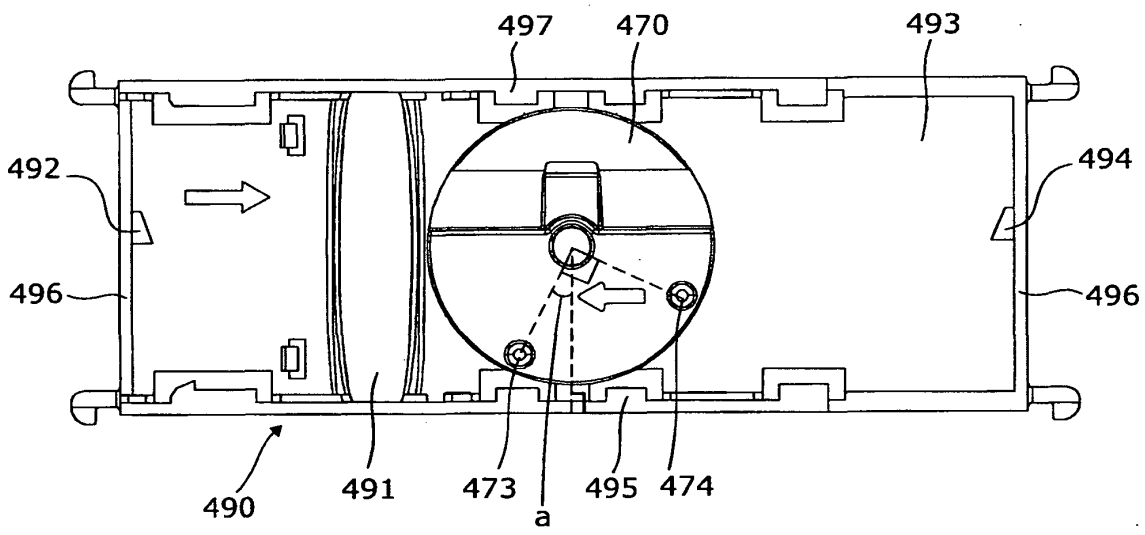

Fig. 11

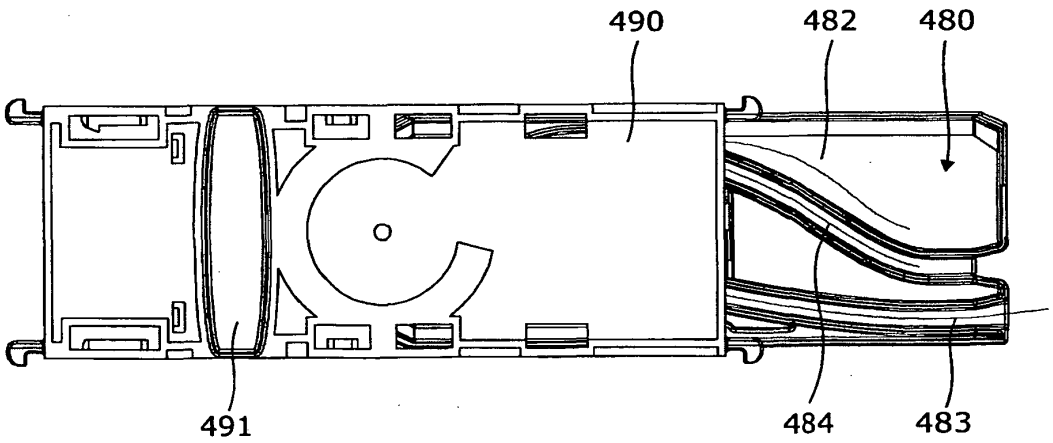

Fig. 11B

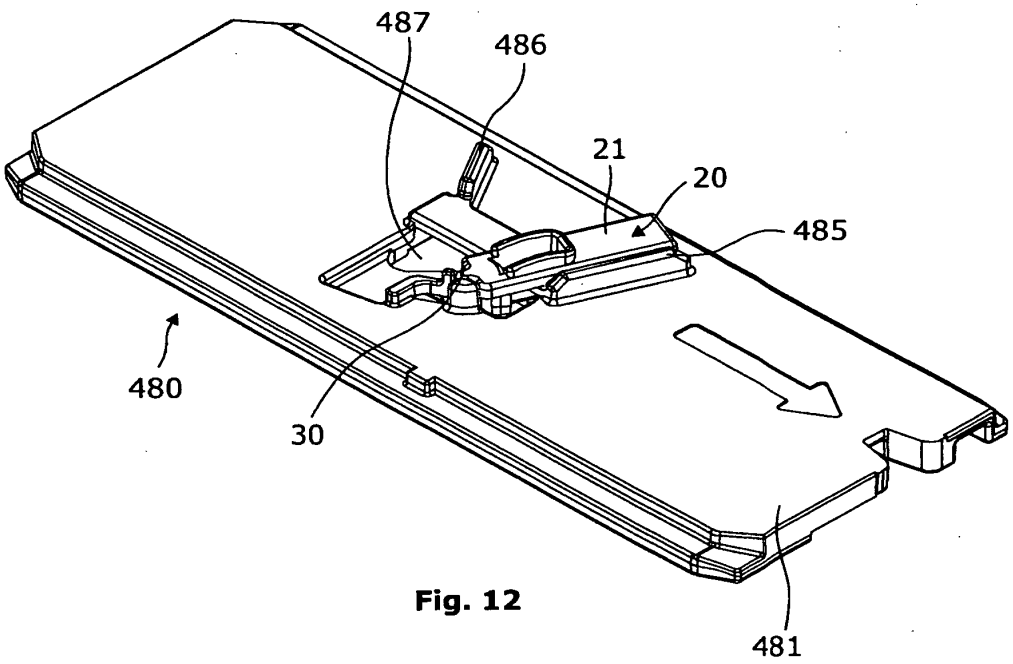

Fig. 12

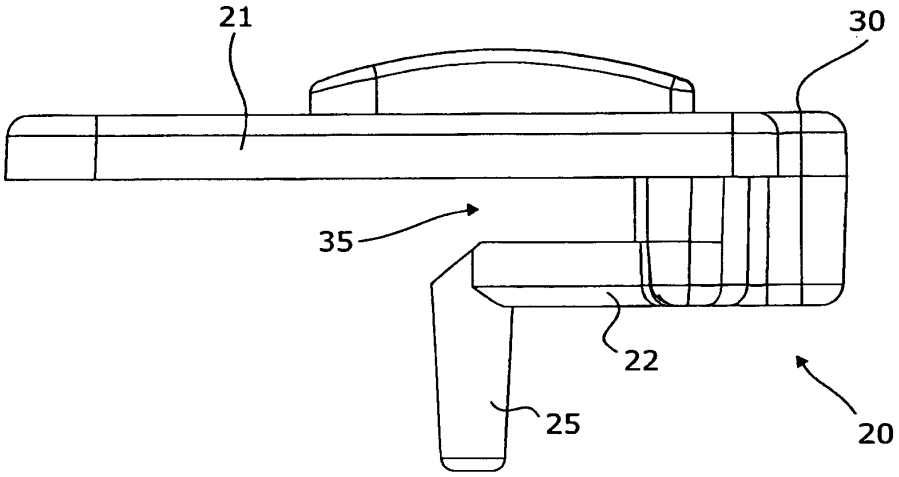

Fig. 12B

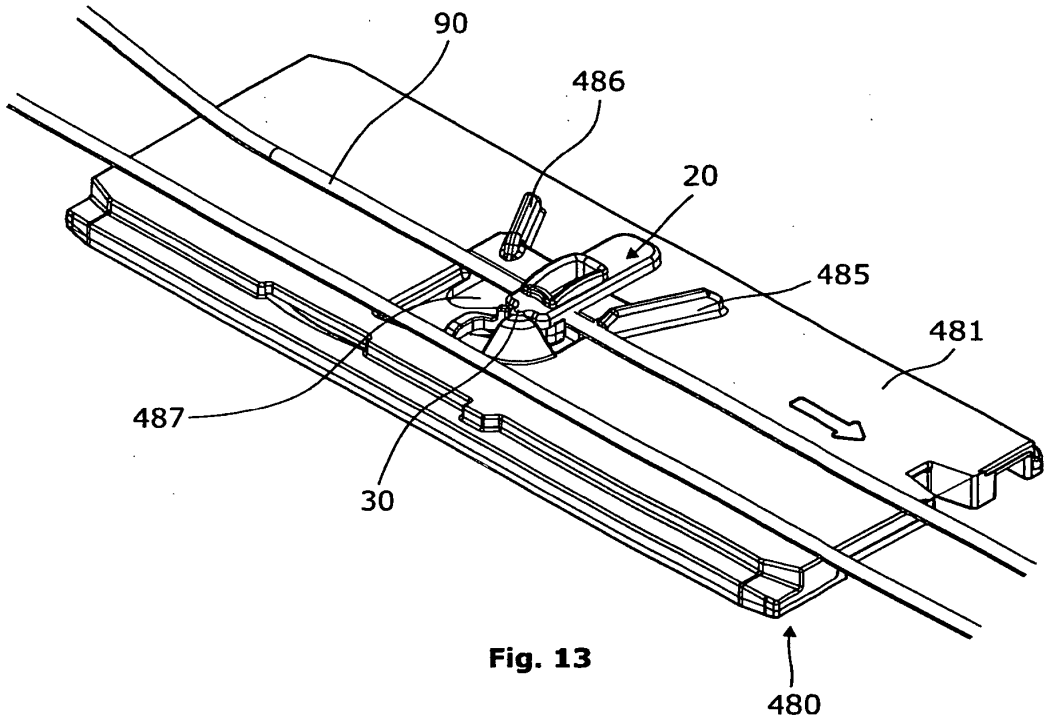

Fig. 13

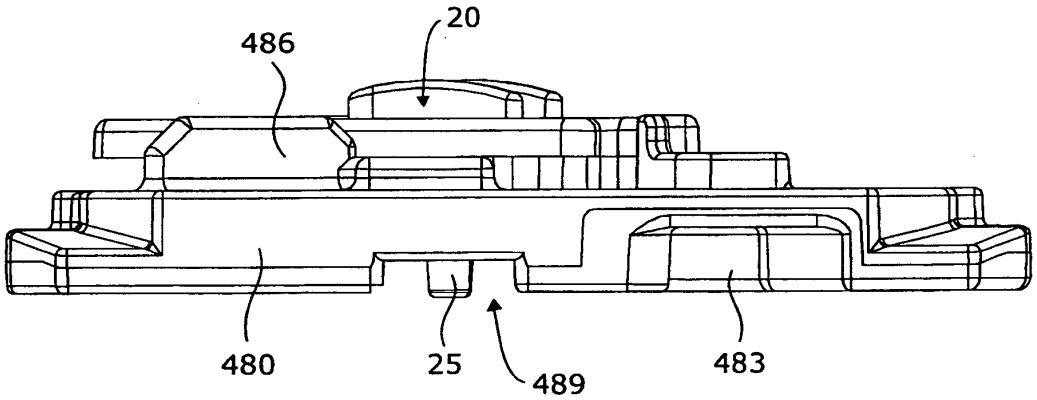

Fig. 14

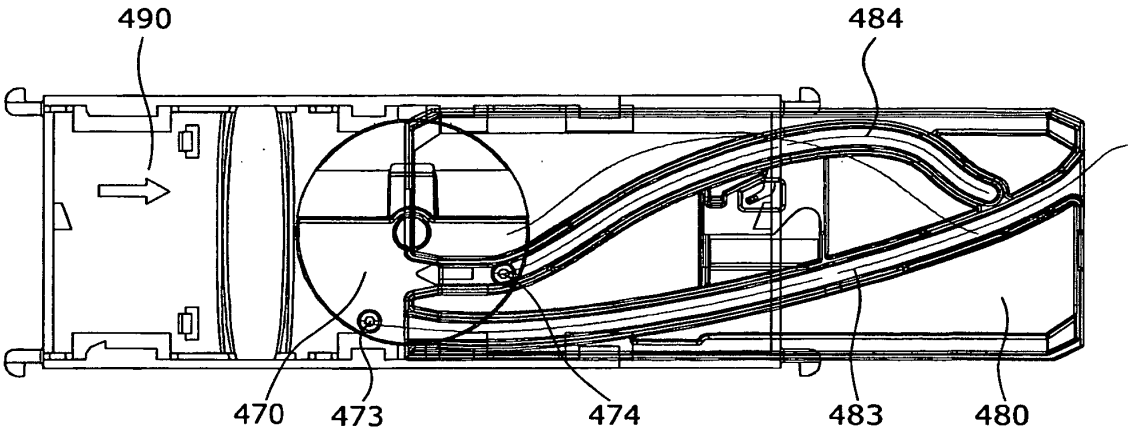

Fig. 15A

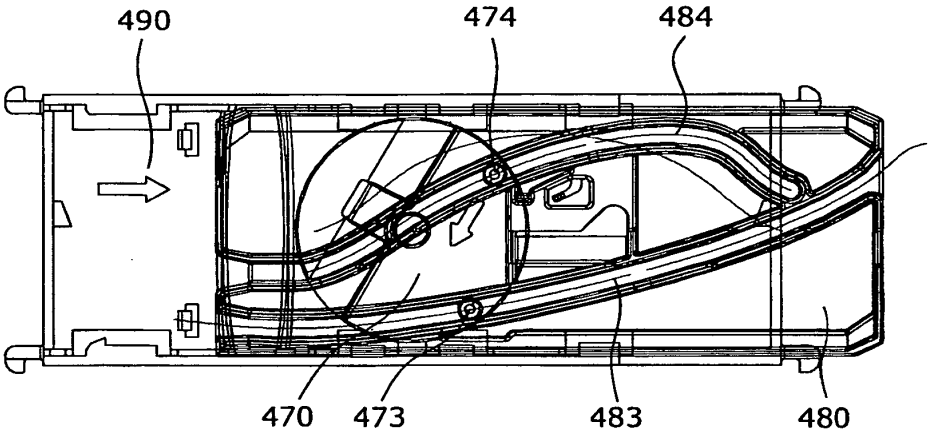

Fig. 15B

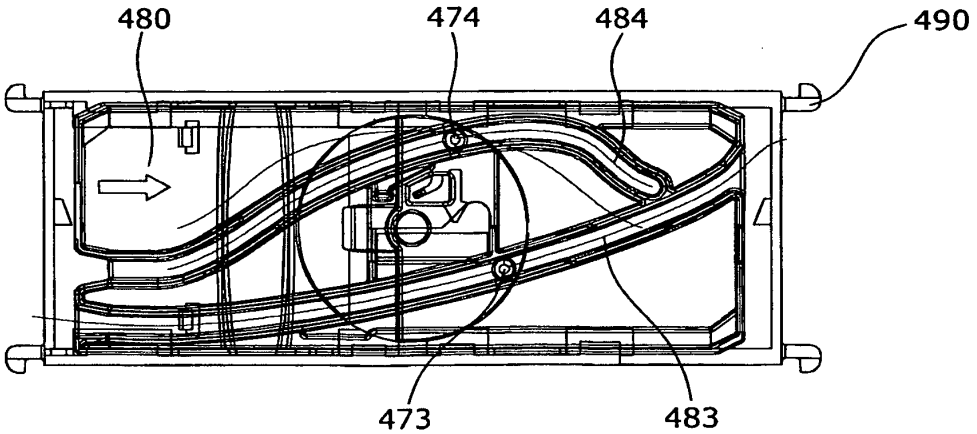

Fig. 15C

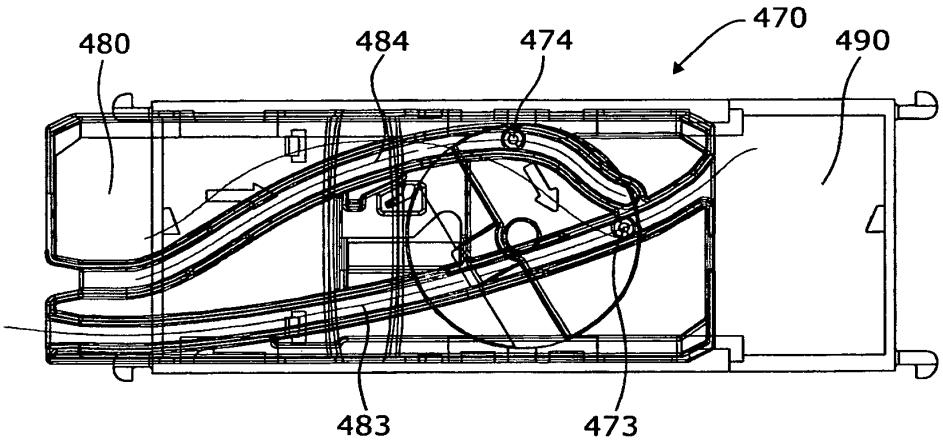

Fig. 15D

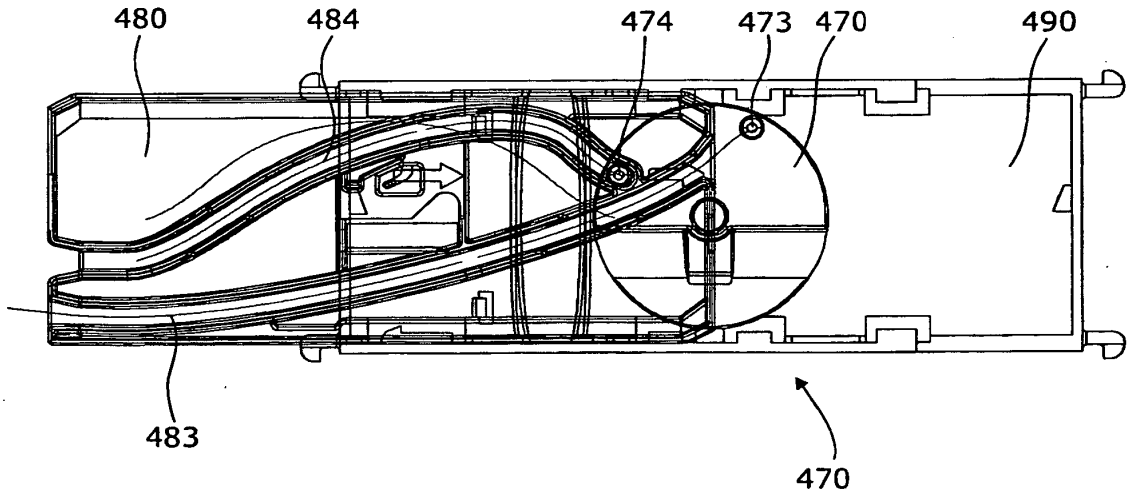

Fig. 15E

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 2004029397 A **[0007]**
- GB 2434824 A **[0008]**
- DE 2732171 **[0009]**