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(54) A readjustable Venetian blind, a method of configuring the blind and a method of suspending the blind

(57) A readjustable Venetian blind (1) of the kind comprising a head rail (2), a hollow bottom rail (3) having a lengthwise cavity (30) with an opening (34) for receiving at least two connectors (11,12), at least one lift cord (7,8) fastened to the at least two connectors (11,12), at least one ladder cord (5,6) comprising two ladder side cords (25,26) fastened to the at least two connectors (11,12), and a number of spaced apart slats (4) suspended between the head rail (2) and the bottom rail (3) on cross rugs of the ladder cords (25,26). The at least two connectors (11,12) are configured for securing and enveloping the at least two connectors (11,12) releaseably in the cavity (30) of the bottom rail (3), and the at least two connectors (11,12) have readjustment means for increasing or reducing the length of the ladder side cords (25,26) between the head rail (2) and the connector (11,12). The design of the connectors allow the height of a Venetian blind to be readjusted as many times as desired to have different heights at each vertical side, and the mountings allow the Venetian blind to be unobstructively moved from side to side only limited by the dimensions of the frame which shall be screened by the Venetian blind.

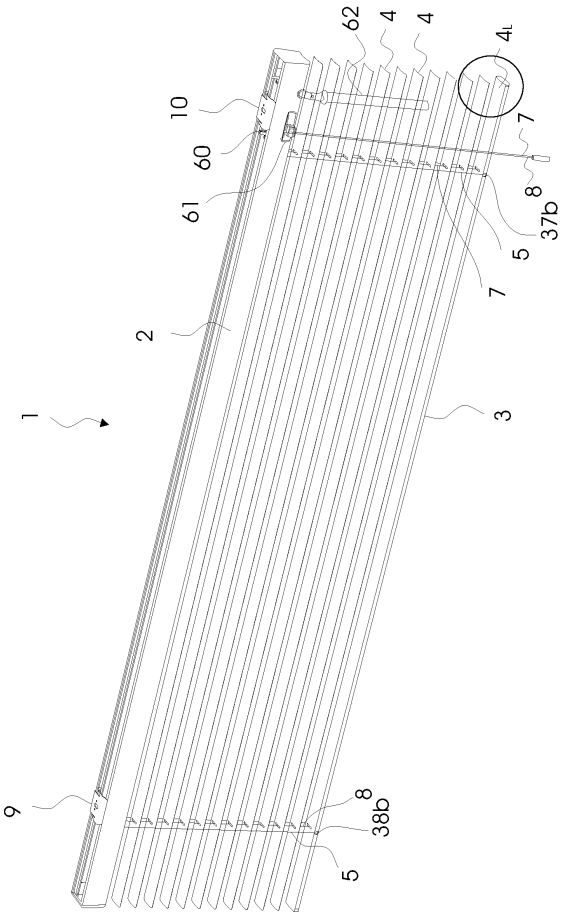

Fig. 2

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Description

[0001] The present invention relates to a readjustable Venetian blind, and methods of configuring and readjusting the Venetian blind.

[0002] The Venetian blind is of the kind comprising a head rail, a hollow bottom rail having a lengthwise cavity with an opening for receiving at least two connectors, at least one lift cord fastened to the at least two connectors, at least one ladder cord comprising two ladder side cords fastened to the at least two connectors, and a number of spaced apart slats suspended between the head rail and the bottom rail on cross rugs of the ladder cords.

[0003] Venetian blinds either have standard dimensions or are manufactured as individual units according to specific conditions of the opening, such as a window, in front of which they are to mounted. For example in old buildings windows slant or is otherwise asymmetric, and standard blinds cannot be used. In spite of individually structuring the blind for such a specific slanting opening readjustment and modification of height and length of the blind is still necessary for the blind to fit appropriately into or on the opening. Moreover, fixed suspension points on a common head rail of a common blind may not be compatible with available anchoring points in the opening and the possibilities of detaching and attaching the blind using suspending or mounting means in the opening is very limited when it comes to conventional Venetian blinds. If for example a new window sill is inserted the blind may be so long that it rests on the window sill and needs shortening. Another known problem is that the window frame may be in a condition in which the mounting brackets for the head rail cannot be securely fastened.

[0004] European patent application no. EP 1808567 A1 discloses a ladder cord assembly for a Venetian blind, where the assembly has a connector including a first portion that is secured to the bottom rail of the blind by means of a snap-fit connection with an opening in the bottom rail, and a second portion for receiving the ladder cord ends in a permanently affixed manner. The ladder cord ends are e.g. welded or fused to the second portion and do not provide for appropriate readjustment of the height of the blind once the blind has been finished. Thus the end user has no provisions at all for modifying the blind to his specific needs. Moreover, the connectors are visible and disfigure the appearance of the blind.

[0005] There is an increasing demand for aesthetic looking high quality blinds fitting perfect to individual needs but this demand is until now not met.

[0006] In a first aspect according to the present invention is provided a readjustable Venetian blind of the kind mentioned in the opening paragraph capable of readjusting the length between the head rail and the bottom rail with or without altering the individual distance between the slats.

[0007] In a second aspect according to the present invention is provided a readjustable Venetian blind of the kind mentioned in the opening paragraph where the readjusting of the length between the head rail and the bottom rail is easy accomplished by e.g. an end user without any special purpose tools.

[0008] In a third aspect according to the present invention is provided a readjustable Venetian blind of the kind mentioned in the opening paragraph which has an aesthetic and pleasant appearance.

[0009] In a fourth aspect according to the present invention is provided a readjustable Venetian blind of the kind mentioned in the opening paragraph which is easy to mount in and demount from an opening.

[0010] The novel and unique way whereby this is achieved according to the present invention is that the at least two connectors are configured for securing and enveloping the at least two connectors releasably in the cavity of the bottom rail, and the at least two connectors has readjustment means for increasing or reducing the length of the ladder side cords between the head rail and the at least two connectors.

[0011] Since the at least two connectors are both secured and enveloped in the cavity of the bottom rail, both the at least two connectors and the free ends of the ladder cords and the lift cords can be hidden to provide a Venetian blind bottom rail having smooth surfaces and an improved aesthetic appearance. If the length of any of said cords needs to be adjusted a connector can simply be released to allow for easy and fast manipulation and readjustement of the length of the cords so that the blind promptly fits the opening. If the length is made shorter the cords are simply pulled and stored in the cavity to be reused if the length later must be increased. Thus the cords need never be cut and the blind according to the present invention can be readjusted over and over again by the end user who saves both money and time. The Venetian blind may even be used for another opening. In addition, no parts protrude from the bottom rail, which parts could bruise the window frame or any other part of the window when the blind swings, is hoisted or is otherwise operated.

[0012] In a preferred embodiment at least one of the at least two connectors are configured with an top part facing towards the opening of the bottom rail and a bottom part facing towards the cavity of the bottom rail, and wherein the readjustment means of the at least two connectors comprises at least one channel for receiving the ladder side cords to releaseably fastening the ladder side cords to the at least two connectors. The ladder side cords can either be guided or pulled through the at least one channel until their positions in relation to the at least two connector are as desired. By providing two spaced apart connectors the height of the length of the ladder side cords between the head rail and the connectors can be increased or reduced individually to even adapt the Venetian blind for an asymmetric opening, e.g. a window.

[0013] One way of fastening conventional lift cords and ladders cords to a connector means is by simply tying a knot on the cord so that the cords cannot escape a connector means in the bottom rail or the bottom rail itself

thereby also defining a limited maximum height of the blind. Alternatively the cords are coiled around the connector means.

[0014] According to the present invention the at least two connectors may have two opposing channels provided in the bottom part for receiving and releaseably fastening respective ladder side cords.

[0015] The readjustment means may advantageously further comprise an opening in the top part of the at least two connectors, which opening is in communication with a corresponding channel and configured to releaseably receive a fastening means for engaging the ladder side cords extending in the channel.

[0016] In this way fastening of the ladder side cords can be obtained simply by guiding or pulling the cords at least partly through the channels, and then inserting the fastening means into the opening in the top part until the fastening means apply a sufficient force on the cords in order for the cords to be fastened firmly inside the channels. The opening in the top part could e.g. be threaded and the fastening means could be a screw for releaseably fastening or pinning the cords inside the channels. Any other kind of fastening means is within the scope of the present invention, such as e.g. a tailstock screw, a dowel or a forced fitted plug. The fastening means serves for engaging, squeezing and/or holding the ladder side cords securely pressed against the interior wall of the channel to maintain selected length. Both the opening in the top part of the at least two connectors and the corresponding fastening means are easy to access from outside through the lengthwise opening of the bottom rail and to manipulate due to the space provided by the cavity of the bottom rail.

[0017] In order to ensure that the at least two connectors can be retained firmly inside the cavity of the bottom rail at least one of the lengthwise opposing free edges of the opening of the bottom rail may have a web projecting towards the cavity, and the at least two connectors may have at least one shoulder or flap for engaging or contacting the web. The shoulder or flap is catched by the projecting web thereby preventing the at least two connectors from escaping the bottom rail as a result of the load and gravity of the suspended parts of the blind on the at least two connectors. In an expedient embodiment the at least one shoulder or flap may be given a controlled degree of flexibility, such as a memory shape, to allow the at least two connectors to be snap-fitted within the bottom rail, while the degree of flexibility is selected to still prevent said at least two connectors to unsnap the webs once load and gravity are applied to the at least two connectors.

[0018] The lengthwise opposing free edges of the opening of the bottom rail may have opposing notches, recesses or indents for receiving and/or guiding the ladder side cords into the channel of the at least two connectors, and the top part of the at least two connectors may have projecting arms for fitting or engaging the notches, recesses or indents. In addition to guiding the ladder side cords through the enveloping wall of the bottom rail the notches, recesses or indents may advantageously engage the corresponding projecting arms to prevent movement of the at least two connectors along the bottom rail, which movement is highly unwanted because it could result in horizontal displacement of the bottom rail in relation to the head rail and thereby a skew Venetian blind.

[0019] Advantageously, the at least two connectors and the cavity of the bottom can be mutually configured and dimensioned to define an internal space below the bottom part of a connector. Any surplus of ladder side cords can after or prior to readjustment be stored in this internal space and makes it very easy for the user to get a grip at the end of a ladder side cord to adjust the length of the ladder side cords between the head rail and the at least two connectors.

[0020] In a preferred embodiment of the invention the cross rugs of the ladder cords below the slat closest to the bottom rail can be absent, and the slat closest to the bottom rail may overlay the lengthwise opening of the bottom rail and cover said lengthwise opening in the bottom rail. In this embodiment it is only the slats above the lowermost slat that are tilted when operating the ladder cords of the blind. The lowermost slat, i.e. the slat closest to the bottom rail, can thus be utilized to cover the opening of the bottom rail at all time during use. The covering of the opening prevent dirt and other unwanted elements from entering the cavity of the bottom rail and provides the bottom rail with a more pleasant appearance, since in contrast to the prior art blind assemblies the cavity of the bottom rail itself and especially the at least two connectors are almost completely hidden.

[0021] The exterior convex curvature of the bottom rail may preferably correspond substantially to the concave curvature of the slat at least at the contacting zones between the bottom rail and the overlaying slat so that a smooth transition between bottom rail and the overlaying slat is achieved.

[0022] A blind needs often to be mounted and detached several times before the optimum fit and adaptation to the opening and the correct position of suspension points are obtained but most conventional mountings are permanently fixed to the head rail making it very difficult to adapt their position to any individual opening. To remedy this disadvantage the blind according to the present invention may comprise at least one mounting for detachably securing the blind in an opening or at a surface.

[0023] Mounting and detachment of a Venetian blind conventionally requires special purpose tools. In direct contrast to this the mounting according to the present invention may provide for detaching and mounting of the Venetian blind as many times as required simply by clamping the head rail onto an inventive mounting in the form of a substantially L-shaped clip having a first leg for extending above a top surface of the head rail and a second leg having a plate spring projecting between the first leg and second leg, which plate spring advanta-

geously may have a hook for hooking on to the head rail opposite the first leg. Either the first leg or the second leg, or both, may be used for securing the mounting to the suspension surface, such as a window frame. By simply applying a pressure force to the plate spring the plate spring will unhook the head rail and the blind can be taken down without further efforts. When the blind is to be remounted pressure is again applied to the plate spring by pressing the head rail against the plate spring so that the hook snaps beneath the head rail again. Thus the mounting according to the present invention is very easy to operate and does not require any tools for clamping or detaching the head rail.

[0024] To further ensure secure engagement between the head rail of the Venetian blind and the mounting, said head rail may have a first engagement means for engaging with second engagement means on the first leg of the mounting. The first engagement means can advantageously be a collar, groove or track provided at the top of the head rail and the second engagement means can be a complementary shaped projection for interlocking releaseably with the first engaging means. Both projections, collars, grooves and tracks are easy to provide on the head rail or mounting during manufacturing using conventional manufacturing techniques such as e.g. extruding and sheet metal forming. The complementary shape of the first and second engagement means provides a reliable coupling together of head rail and mounting.

[0025] As mentioned above the invention also relates to a method of configuring a readjustable Venetian blind of the kind mentioned in the opening paragraph where the Venetian blind comprises a head rail, a hollow bottom rail having a lengthwise cavity with an opening for receiving at least two connectors, at least one lift cord fastened to the at least two connectors, at least one ladder cord comprising two ladder side cords fastened to the at least two connectors, and a number of spaced apart slats suspended between the head rail and the bottom rail on cross rugs of the ladder cords.

[0026] The inventive method further comprises the steps of

a. in the cavity of the bottom rail releaseably providing, in an enveloping manner, at least two spaced apart connectors having a top part facing towards the opening of the bottom rail, a bottom part facing towards the cavity of the bottom rail, and at least one channel for receiving the ladder side cords,

b. increasing or reducing the length of the ladder side cords between the head rail and the at least two connectors to adjust or readjust the distance between the head rail and the bottom rail,

c. fastening a releaseably fastening means in the at least one channel of the at least two connectors for engaging and fastening at least the ladder side cords extending in the at least one channel, and

d. repeating step c and b until the Venetian blind is readjusted to fit an opening.

[0027] This method enables the end user to adapt the Venetian blind according to individual need and requirements of an opening only limited by the initial and original dimensions of the components of the Venetian blind.
If the method comprises the further step of fastened the lift cord releaseably and/or length adjustably to the at least two connectors any given distance between the head rail and the bottom rail can be obtained for the Venetian blind.

[0028] An elegant appearance of the Venetian blind can be achieved by covering the lengthwise opening in the bottom rail simply by removing the cross rugs of the ladder cords below the slat closest to the bottom rail and arranging the slat closest to the bottom rail to overlay the opening of the bottom rail. Alternatively, the cross rugs may be absent already from manufacturer side or can be made detachable.

[0029] A method for suspending the Venetian blind in an opening is also provided.

[0030] The suspension method comprises the steps of

- securing at least one mounting to a subjacent surface,
- applying a pressure force on the plate spring of the second leg of the at least one mounting by substantially horizontally forcing the head rail against the plate spring until the hook snaps beneath the head rail and the first engagement means of the head rail engages the second engagement means on the first leg of the at least one mounting, and
- adjusting the horizontal position of the head rail by sliding the suspended head rail in the at least one mounting.

[0031] The invention will be described in greater detail below with reference to the accompanying drawing in which

fig. 1 shows, seen in perspective, an exploded view of a Venetian blind according to the present invention,

fig. 2 shows the same in an assembled state ready for being suspended in an opening,

fig. 3 shows, seen in perspective, a connector seen oblique from the top part,

fig. 4 shows the same, but oblique from the bottom part,

fig. 5 shows in an enlarged view a sectional view taken along line V-V in fig. 3,

fig. 6 shows the bottom rail seen in perspective and fragmentary,

fig. 7 shows a sectional view taken along line VII-VII of fig. 6 of the bottom rail with the section of the connector shown in fig. 5 inside,

fig. 8 shows, seen in perspective, the connector of fig. 3 enveloped by a fragment of the bottom rail,

fig. 9 shows, seen in perspective, a fragment of the bottom corner of a distended Venetian blind where a fragment of the lowermost slat covers the opening of the cavity,

fig. 10 shows, seen in perspective, a mounting seen oblique from the top of the first leg,

fig. 11 shows, seen in perspective, a mounting seen oblique from the top of the second leg,

fig. 12 shows, seen in perspective and from the side facing away from the opening, the head rail having two mountings inserted,

fig. 12a shows, seen in perspective and from the side facing away from the opening, a fragment of a top corner of the head rail having a mounting inserted,

fig. 13 shows the same as fig. 12 but from the side facing incoming light,

fig. 13a shows the same as fig. 13a but from the side facing incoming light, and

fig. 14 shows a sectional view taken along line XIV-XIV of fig. 13 of the head rail.

[0032] In the following description the Venetian blind is used for covering a window opening, however within the scope of the present invention coverage of any opening, including a door, is intended. The Venetian blind may also be used as a room divider or for concealing purposes. Any number of slats is foreseen within the scope of the present invention but for the sake of clarity only a limited number is shown in the subsequent figures. The length and width of the Venetian blind and the number of ladder cords, slats, connectors and mountings can be selected as desired.

[0033] The Venetian blind 1 shown in fig. 1 comprises a head rail 2, a bottom rail 3, a plurality of slats 4 suspended at a distance h from each other between the head rail 2 and the bottom rail 3 by means of ladder cords 5,6 and lift cords 7. The head rail 2 is provided with a tilting mechanism, which serves for tilting the slats 4 to effectively screen the light, and a hoisting mechanism (not shown), serving for hoisting and lowering the bottom rail 3. The tilting mechanism may be conventional or be made with a new toothed gear transmission between tilting rod and an actuator means fully or partly situated inside the head rail 2 to facilitate an unobstructed reliable smooth tilting operation. Also the hoisting mechanism may be conventional or specifically adapted to the inventive Venetian blind.

[0034] The Venetian blind 1 comprises two spaced apart mountings 9,10 for suspending the blind 1 to the frame of an opening or any other suitable surface. The Venetian blind 1 further comprises two connectors 11,12 for releaseably fastening the ladder cords 7,8 to the bottom rail 3. The connectors 11,12 are inserted and hidden in the cavity of the bottom rail 3 when suspended, as seen better in the assembled view of fig. 2, where the lowermost slat 4_L rests nicely on top of the bottom rail 3 when the Venetian blind 1 is in use to cover an opening to which the dimensions of the Venetian blind is adapted.

[0035] The structural design of the unique connectors 11,12 according to the present invention is shown in the perspective views of figs. 3 and 4, and in the sectional view of fig. 5. The connectors 11,12 are identical and only one is referred to in the following detailed description.

[0036] The connector 11 has a top part 13 facing towards the lowermost slat 4_L and a bottom part 14 facing towards the bottom rail 3 when the connector 11 is inserted in this bottom rail 3. The connector 11 is symmetrical about an axis A extending parallel to the longitudinal axis of the bottom rail 3 and none symmetrical about an axis B extending crosswise to the axis A.

[0037] The connector 11 has a central hole 15 for receiving a lift cord 7. The lift cord 7 may be provided with a knot (not shown) having a larger diameter than the diameter of the central hole 15 to ensure that the free end of the lift cord 7 cannot slip out through the central hole 15 once inserted and adjusted. The surplus of lift cord 7 passing through the central hole 15 in the top part 13 of the connector 11 is guided further on into a guideway 16 provided in the bottom part 14 of the connector to allow the surplus of lift cord 7 to be stored and hidden inside the bottom rail 3 until further use.

[0038] The connector 11 has opposing arms 17,18 for mounting the connector 11 in a fixed position and for controlling the guidance of the ladder side cords 25,26 into the connector 11.

[0039] For the latter purpose the arms 17,18 have free ends 19,20 with respective openings 21,22 extending into corresponding channels 23,24 in the bottom part 14. The channels 23,24 direct the ladder side cords 25,26 from a substantially vertical orientation at the entrance of the openings 21,22 and further along the bottom part 14 of the connector to a substantially horizontal position. The channels 23,24 open into the guideway 16 just as the central hole 15. Thus the guideway also receives the side ladder cords 25,26 of the ladder cord 5. The channels 23,24 allow readjustment of the distance between the head rail 2 and the bottom rail 3 by displacement of the ladder side cords 25,26 in the channels 23,24. Displacement takes place in a very simple manner by either pulling at the ladder side cords 25,26 to reduce its length or by easening of the ladder side cords 25,26 to increase

its length. It is of course understood that all connectors 11,12 are used for readjusting so that the final appearance of the Venetian blind 1 fits exactly into the opening, e.g. a window.

[0040] Fastening holes 27,28 are configured for receiving a releaseably fastening means 29, the height of which can be altered so that the screw or other fastening means squeezes and jams the ladder side cords strongly inside the channels 23,24. The fastening means may for example be a tailstock screw but other kinds of screw can also be used. The preferred fastenings means has a flat or rounded end face for engaging the subjacent ladder side cord to avoid damaging said ladder side cord.

[0041] As is apparent from fig. 4 and fig. 5, since the ladder side cords 25,26 also are bend several times during passage of the route from the openings 21,22 in the arms 17,18, through the channels 23,24 of the bottom part 14 and out into the bottom rail 3 via the guide way 16 this route constitutes a chicane in which the bends, due to the load applied on the connector 11 of the Venetian blind 1 when it is suspended, serves as traps for supplementing the fastening means 29 in preventing unintentional or accidental displacement of the ladder side cords 25,26.

[0042] Fig. 3, 4 and 5 further illustrate that the connector 11 has shoulders or tabs 32 projecting from the top part 13 on both sides of an arm 17,18 of the connector 11. When the connector 11 is inserted in the bottom rail 3 the projecting tabs 32 abut the inside of the bottom rail, optionally engage corresponding means provided inside the bottom rail 3, so that the connector 11 does not dislocate towards the head rail 2 and the bottom rail drops off Venetian blind.

[0043] As seen in the perspective fragmentary view of fig. 6 the bottom rail 3 has a longitudinal cavity 30 defined by enveloping exterior wall 31 and end plugs 33. The cavity 30 is accessible via the lengthwise opening 34, which opening is delimited by opposing lengthwise edges 35,36. The lengthwise edges 35,36 has two pairs of opposing notches 37a,37b for receiving corresponding arms 17,18 of a connector 11 and inwards turning webs 38a,38b serving as backstoppers holding the bottom rail 2 together with the connectors 11,12. Also the curvatures of the end plugs 33 are intended to bulge with convex curvatures similar to the curvature of the slats if preferred.

[0044] As is clear from the sectional view of fig. 7 the curvatures of the exterior wall 31 is intended to correspond or mimic the curvatures of the slats 4, generally the convex curvature. The connector 11 is suspended in the arms 17,18 and in the notches 37a,37b.

[0045] Fig. 8 is a perspective fragmentary view of a bottom rail 3 having a connector 11 inserted. As explained in relation to fig. 6 the arms 17,18 of the connector 11 rest in notches 37a,37b in the edges 35,36 of the bottom rail 3 and receive and direct the ladder side cords 25,26 via the openings 21,22 through the channels 23,24 towards a space 39 below the bottom part 14 at the bottom of the cavity 30 of the bottom rail 3. The bottom part 14 and the top part 13 of the connector 1 have outlines or overall surface curvatures corresponding to the interior concavity of the bottom rail 3.

[0046] By applying the curvature of the slats to the bottom rail the lowermost slat 4_L can settle on top of the bottom rail 3 and hide the connector inside the cavity 30 of the bottom rail as seen in the enlarged scaled view of fig. 9 of a bottom corner of the Venetian blind 1 seen in fig. 2.

[0047] Fig. 10 and fig. 11 illustrates in two obliquely different perspective views a preferred embodiment of an L-shaped mounting 40 for releaseably securing the Venetian blind 1 to a surface using a sufficient number of such mountings 40.

[0048] The L-shaped mounting 40 has a first leg 41 and a second leg 42 and a plate spring 43 flexibly projecting from the second leg 42 in the gap 44 between the first leg 41 and the second leg 42. The plate spring 43 has a free end 45 with a hook 46 for grasping under the head rail 2. The first leg 41 has a rectangular mounting opening 47 allowing the mounting 40 to be pushed forth and back until final securing at the appropriate location can take place by means of e.g. screws (not shown) inserted through mounting opening 47 and optionally through screw openings 48. The second leg 42 also has rectangular mounting openings 49 and screw openings 50 serving similar purpose, and any of the openings and screw holes of either the first leg 41 or the second leg 42, or of both, can be used to secure the mounting 40 correct and secure at a surface. The sides 51a,51b of the second leg 42 are turned at an angle of about 90° toward the free end 52 of the first leg 41 and have opposing free edges 53a,53b having a curvature corresponding substantially to the curvature of the back face of the head rail 2 facing the suspension surface, so that when the mounting 40 is arranged on the head rail 2, a firm abutment against both the head rail 2 and the suspension surface is obtained thereby avoiding any disturbing clearance.

[0049] The head rail 2 has a first engagement means 54a,54b for engaging with opposing second engagement means 55 on the free end of the first leg and opposing second engagement means 56 on the first leg 40 as will be described further in relation to figs. 12, 13 and 14.

[0050] The second engagement means 55 may be an U-shaped projection 57, as in the mounting shown in fig. 10 and 11, for engaging first engagement means 54a, such as a groove configured as an inverted U-shaped hook means 54a along a top front edge 58a of the head rail 2, as seen in fig. 12. The opposing second engagement means 56 may include springlike tabs or flaps 56a, 56b projecting opposite the free end 52 towards the second leg 42 to fit tensioned with a spring force under an inwardly turning breast or web 54b of a first engagement means 54b on a top edge 58b of the head rail 2. The first and the second engagement means can within the scope of the present invention have any appropriate complementary shape and are not limited to the means illustrat-

ed in figs. 10 and 11.

[0051] Once the mounting location has been selected and the mounting has been secured by e.g. screwing it to a window frame, the head rail 2 can be releaseably snapfitted to the mounting 40. The first leg of the mounting projects above the head rail and the second leg projects behind the head rail so that the mounting is not in contact with any of the hoisting and tilting mechanism, so when the mounting is secured to the head rail 2, the head rail 2 can be horizontally moved or slid from side to side unobstructed by the mountings 40 so that the Venetian blind 1 can be arranged exactly where is it needed. The structure of the mounting 40 do not restrict this possibility of freely pushing the Venetian blind 1 from side to side as if the mounting 1 were integrated in the head rail 2 or if the positioning of the mounting 40 was restricted by mounting holes or mounting openings in the head rail 2. The mountings 40 appear hidden by the head rail 2, and because the first engagement means 54a,54b extends along the entire length of the head rail 2 a substantially unlimited degree of freedom to select the mounting location for the mounting is ensured.

[0052] The arrangement of the mounting 40 in relation to a head rail 2 is seen better in fig. 12, 12a, 13 and 13a.

[0053] Fig. 12 shows, seen in perspective and from the side facing away from the opening, which the Venetian blind 1 should cover, i.e. for example seen from inside a room, the head rail with a few slats 4 below. Fig. 12a shows in an enlarged scale a detail of a top corner of the head rail 2 shown in fig. 12.

[0054] The top front edge 58a and the back top edge 58b of the head rail 2 have first engaging means 54a, 54b respectively. The flaps 56b of the first leg 41 of a mounting engages below a protruding first engagement means 54b in the form of a projecting web 54b, and the U-shaped projection 57 engages the inverted U-shaped hook means 54a constituting the first engagement means of the front top edge 58a of the head rail 2.

[0055] The mounting 40 is clipped onto the top opening 59 of the head rail 2 in a very easy procedure and can be detached simple by pressing the head rail 2 towards the spring plate 43 of the second leg 42 and at the same time tilt the head rail 2 so that the second engagement means and the first engagement means disengage. Clamps 60 for holding the hoisting cylinder for the the lift cords 7,8 and optionally the ladders cords 5,6 are accommodated inside the top rail 2 as well as the tilting mechanism 61. Clamps 60, hoisting cylinder 61 and tilting mechanism 62 can be conventional or especially designed for the inventive Venetian blind 1.

[0056] Fig. 13 and fig. 13a shows in a similar manner how the mounting 40 is arranged at the head rail 2, but viewed from outside the room, i.e. from the side facing incoming light. The curved edges 53a,53b of the sides 51a,51b of the second leg 42 ensures optimum abutment of the mounting 40 against the surface of the back wall 62 of the head rail 2. The second leg 42 of the mounting 40 appears with a flat abutment face 63 for resting on the support surface of e.g. a window frame or a door frame.

[0057] Fig. 14 shows a sectional view taken along line XIV-XIV of fig. 13 of the head rail 2. Referring to the orientation used in fig. 14 the curved back wall 62 of the head rail 2 that faces towards a suspension surface is to the right, and the opposing curved front wall 64, which is visible to the viewer, is to the left. The back wall 62 is connected to the front wall 64 via a bottom wall 65 having an exterior concave surface of a curvature corresponding to the convex curvature of topmost slat 4.

[0058] The distance from the topmost slat 4 and the bottom wall 65 of the head rail 2 is adjusted by means of the ladder cords 5,6 so that the topmost slat 4 can be tilted to closely follow the radius of curvature of the concavity of the inwardly dented bottom wall 65 to prevent light from entering the space between the topmost slat 4 and the bottom wall 65. The height H of the head rail 2 is greater at the front wall 64 and at the back wall 65 than the height d taken at the dent 66 of the bottom wall 65, so that the free edge of a tilted slat 4 is accommodated in the dent. In this arrangement substantially no light or none light can pass between the head rail 2 and the topmost slat 4.

[0059] The Venetian blind according to the present invention is easy and simple to adjust both horizontally and vertically to fit any opening needing covering or blinding. The Venetian blind can be slid to the right and left due to the nature of the mountings, and the connectors enable a very high degree of freedom to readjust the height of the Venetian blind. The Venetian blind can be detached from the mounting very fast and in a single operation either for readjusting or for cleaning.

[0060] Further, the Venetian blind may be decorated with colored elongated areas along the trailing and/or leading edges of the slats as disclosed in co-pending European Patent application no. EP09151751.6 filed January 30, 2009, which colored eleongated area is incorporated in the present application by way of reference.

Claims

1. A readjustable Venetian blind (1) of the kind comprising

- a head rail (2),
- a hollow bottom rail (3) having a lengthwise cavity (30) with an opening (34) for receiving at least two connectors (11,12),
- at least one lift cord (7,8) fastened to each connector (11,12),
- at least one ladder cord (5,6) comprising two ladder side cords (25,26) fastened to each connector (11,12), and
- a number of spaced apart slats (4) suspended between the head rail (2) and the bottom rail (3) on cross rugs of the ladder cords (5,6),

characterised in that

- the at least two connectors (11,12) are configured for securing and enveloping the at least two connectors (11,12) releasably in the cavity (30) of the bottom rail (3), and
- the at least two connectors (11,12) have readjustment means for increasing or reducing the length of the ladder side cords (25,26) between the head rail (2) and the connector (11,12).

2. A readjustable Venetian blind (1) according to claim 1, **characterised in that** a least one of the at least two connectors (11,12) is configured with

- a top part (13) facing towards the opening (34) of the bottom rail (3) and a bottom part (14) facing towards the lengthwise cavity (30) of the bottom rail (3), and wherein
- the readjustment means of the at least two connectors (11,12) comprises at least one channel (23,24) for receiving the ladder side cords (25,26) to releaseably fastening the ladder side cords (25,26) to the connector (11,12).

3. A readjustable Venetian blind (1) according to claim 2, **characterised in that** the readjustment means further comprises a fastening hole (27,28) in the top part (13) of the at least two connectors (11,12), which fastening hole (27,28) is in communication with a corresponding channel (23,24) and configured to releaseably receive a fastening means (29) for engaging a ladder side cord (25,26) extending in the channel (23,24).

4. A readjustable Venetian blind (1) according to claims 1, 2 or 3, **characterised in that**

- at least one of the lengthwise opposing free edges (35,36) of the opening (34) of the bottom rail (2) has a web (38a,38b) projecting towards the cavity (30), and
- the at least two connectors (34) have at least one shoulder (32) or flap for engaging or contacting the web (38a,38b).

5. A readjustable Venetian blind (1) according to any of the preceding claims 1-4, **characterised in that**

- the lengthwise opposing free edges (35,36) of the lengthwise opening (34) of the bottom rail (2) have opposing notches (37a,37b), recesses or indents for receiving and/or guiding the ladder side cords (25,26) into the channel (23,24) of the at least two connectors (11,12), and
- the top part (13) of the at least two connectors (11,12) have projecting arms (17,18) for fitting or engaging the notches (37a,37b), recesses or indents.

6. A readjustable Venetian blind (1) according to any of the preceding claims 2-5, **characterised in that** the at least two connectors (11,12) and the cavity (30) of the bottom rail (2) are mutually configured and dimensioned to define an internal space (39) below the bottom part (14) of the at least two connectors (11,12).

7. A readjustable Venetian blind (1) according to any of the preceding claims 1-6, **characterised in that**

- the cross rugs of the ladder cords (5,6) below the slat (4_L) closest to the bottom rail (2) is absent, and
- the slat (4_L) closest to the bottom rail (2) overlays the lengthwise opening (34) of the bottom rail (2) and covers the lengthwise opening (34) of the bottom rail (2).

8. A readjustable Venetian blind (1) according to any of the preceding claims 1-7, **characterised in that** the exterior convex curvature of the bottom rail (2) corresponds substantially to the concave curvature of the slat (4) at least at the contacting zones between the bottom rail (2) and the overlaying slat (4_L).

9. A readjustable Venetian blind (1) according to any of the preceding claims 1-8, **characterised in that** the curvature of at least one of the exterior surfaces of the bottom rail (2) and/or the head rail (3) corresponds to the curvature of a slat (4).

10. A readjustable Venetian blind (1) according to any of the preceding claims 1-9, **characterised in that** the Venetian blind (1) comprises at least one mounting (40) for detachably securing the Venetian blind (1) in an opening or at a surface.

11. A readjustable Venetian blind (1) according to any of the preceding claims 1-10, **characterised in that** the mounting (40) is a substantially L-shaped clip having a first leg (41) for extending above a top surface of the head rail (2), and a second leg (42) having a plate spring (43) projecting between the first leg (41) and the second leg (42), which plate spring (43) has a hook (46) for hooking on to the head rail (2), at least one of the first (41) and the second legs (42) serve for securing the head rail (2) to at least a suspending surface.

12. A readjustable Venetian blind (1) according to any of the preceding claims 1-11, **characterised in that** the head rail (2) has a first engagement means (54a, 54b) for engaging with second engagement means (55,56) on the first leg (41) of the mounting (40).

13. A readjustable Venetian blind (1) according to any of the preceding claims 1-12, **characterised in that** the first engagement means is a collar, groove or track (54a) provided at the top of the head rail (2) and the second engagement means is a complementary shaped projection (56) for interlocking releaseably with the first engaging means (54a).

14. A method of configuring a readjustable Venetian blind (1) of the kind comprising a head rail (2), a hollow bottom rail (3) having a lengthwise cavity (30) with an opening (34) for receiving at least two connectors (11,12), at least one lift cord (7,8) fastened to the at leach two connectors (11,12), at least one ladder cord (5,6) comprising two ladder side cords (25,26) fastened to the at least two connectors (11,12), and a number of spaced apart slats (4) suspended between the head rail (2) and the bottom rail (3) on cross rugs of the ladder cords (5,6), **characterised in that** the method comprises the steps of

a. in the cavity (30) of the bottom rail (2) releaseably providing, in an enveloping manner, at least two spaced apart connectors (11,12) having a top part (13) facing towards the opening (34) of the bottom rail (2), a bottom part (14) facing towards the cavity (30) of the bottom rail (2), and at least one channel (23,24) for receiving the ladder side cords (25,26),
b. increasing or reducing the length of the ladder side cords (25,26) between the head rail (2) and the at least two connectors (11,12) to adjust or readjust the distance between the head rail (2) and the bottom rail (3),
c. fastening a releaseably fastening means (29) in the at least one channel (23,24) of the at least two connectors (11,12) for engaging and fastening at least the ladder side cords (25,26) extending in the at least one channel (23,24), and
d.repeating step c and b until the Venetian blind (1) is readjusted to fit an opening.

15. A method according to claim 14, **characterised in that** the method comprises the further step of fastened the lift cords (7,8) releaseably and/or length adjustably to the at least one connector (11,12).

16. A method according to any of the claims 14 or 15, **characterised in that** the method comprises the further steps of removing the cross rugs of the ladder cords (5,6) below the slat (4_L) closest to the bottom rail (3), and arranging the slat (4_L) closest to the bottom rail (2) to overlay the bottom rail (3) and cover the lengthwise opening (34) of the bottom rail (3).

17. A method of suspending a Venetian blind (1) according to any of the preceding claims 10 -13, **characterised in that** the method comprises the steps of

- securing at least one mounting (40) to a subjacent surface,
- applying a pressure force on the plate spring (43) of the second leg (41) of the at least one mounting (40) by substantially horizontally forcing the head rail (2) against the plate spring (43) until the hook (46) snaps beneath the head rail (2) and the first engagement means (54a,54b) of the head rail (2) engages the second engagement means (55,56) on the first leg (41) of the at least one mounting (40), and
- adjusting the horizontal position of the head rail (2) by sliding the suspended head rail (2) in the at least one mounting (40).

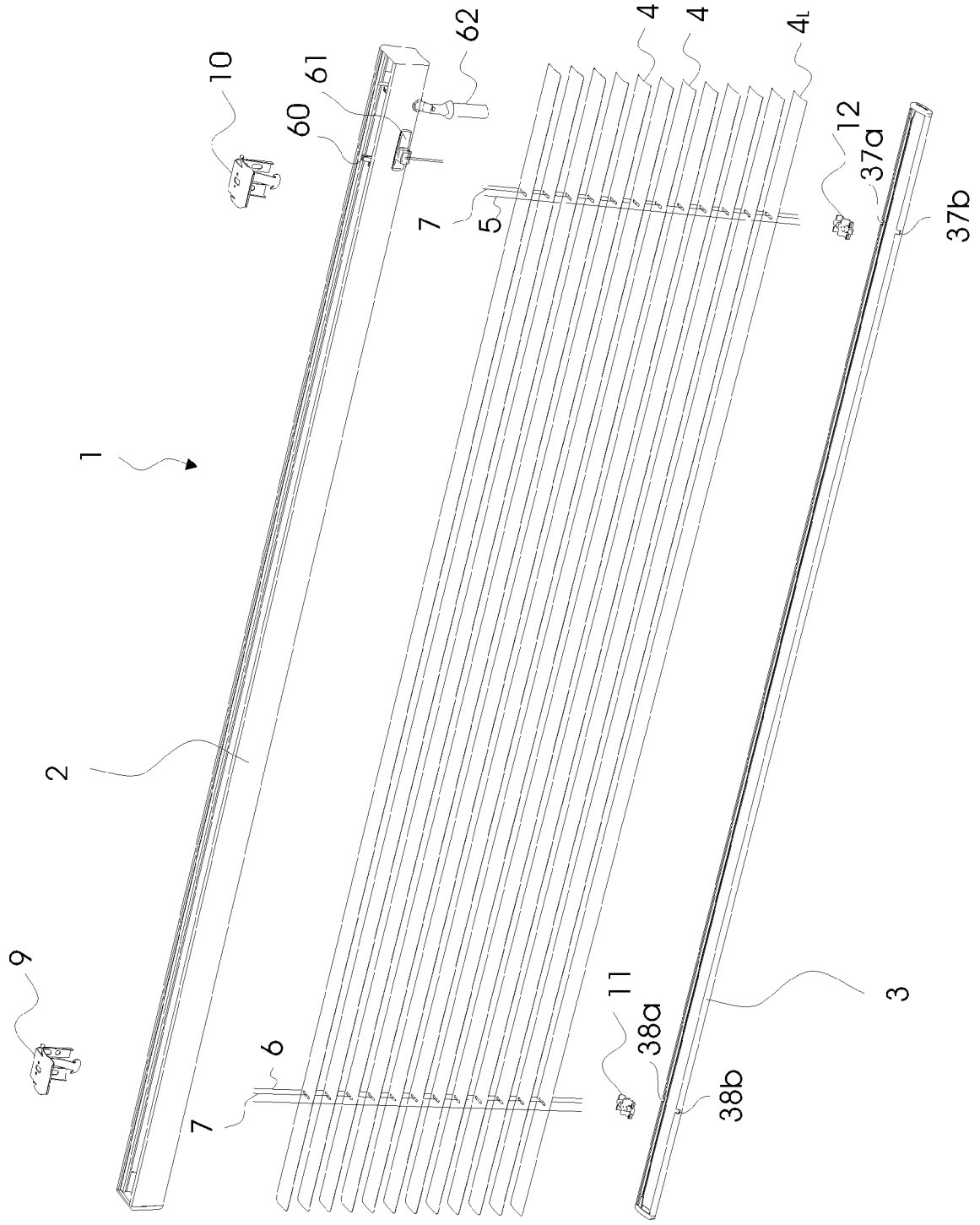

Fig. 1

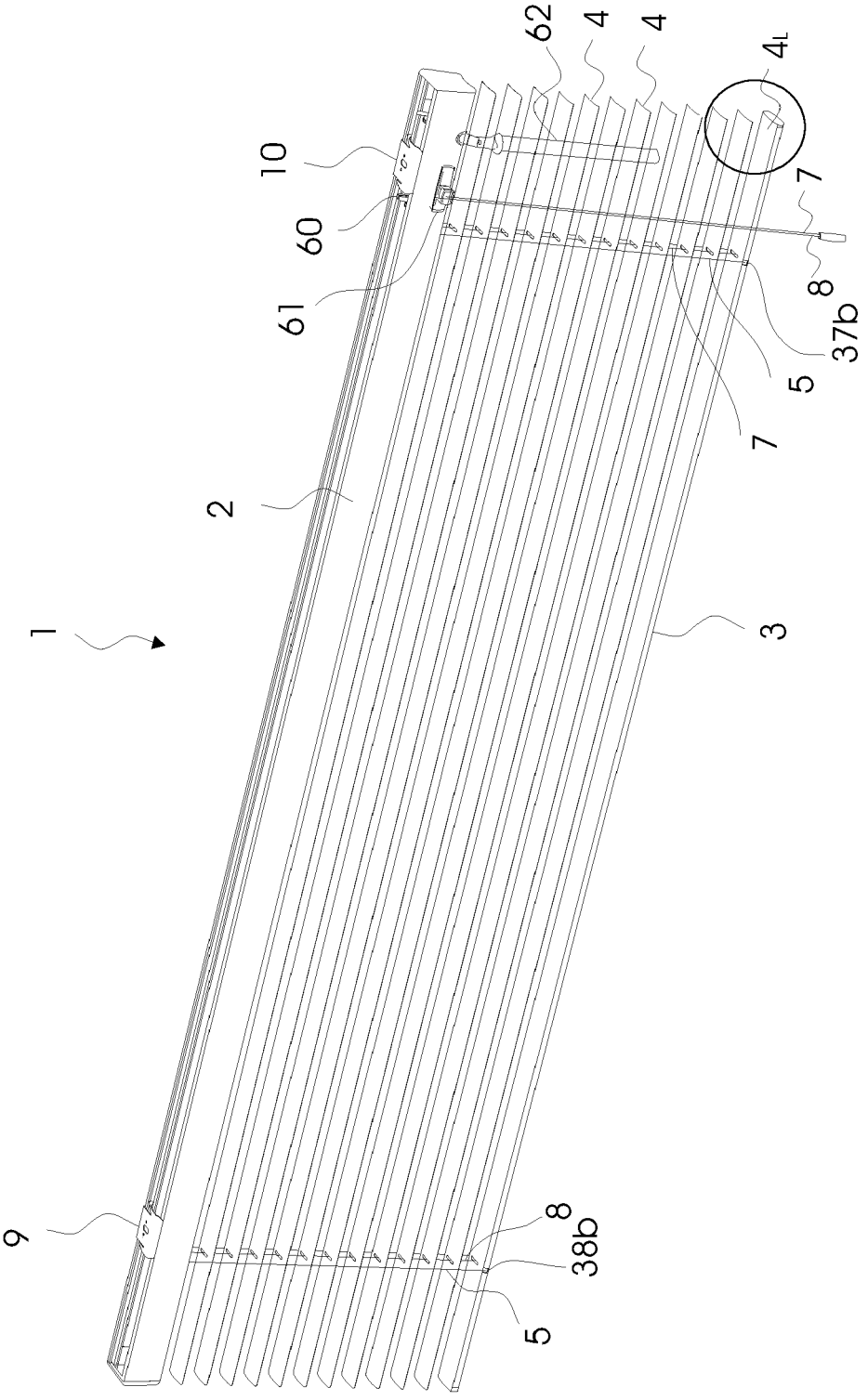

Fig. 2

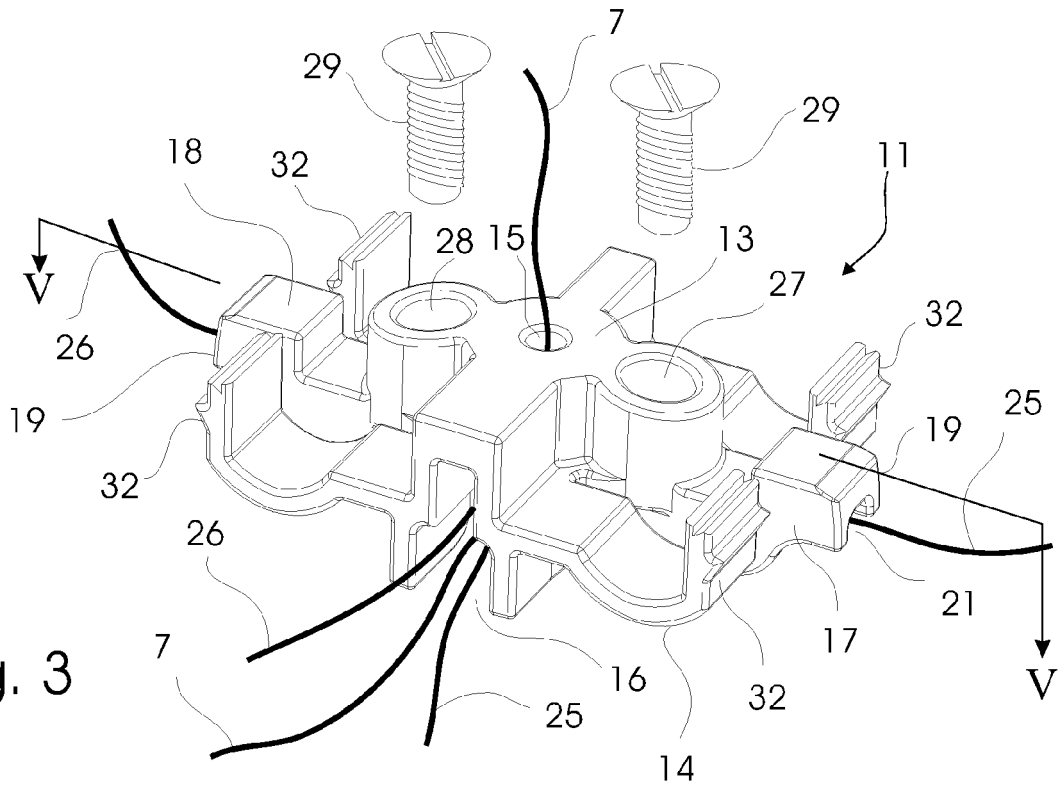
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Fig. 3

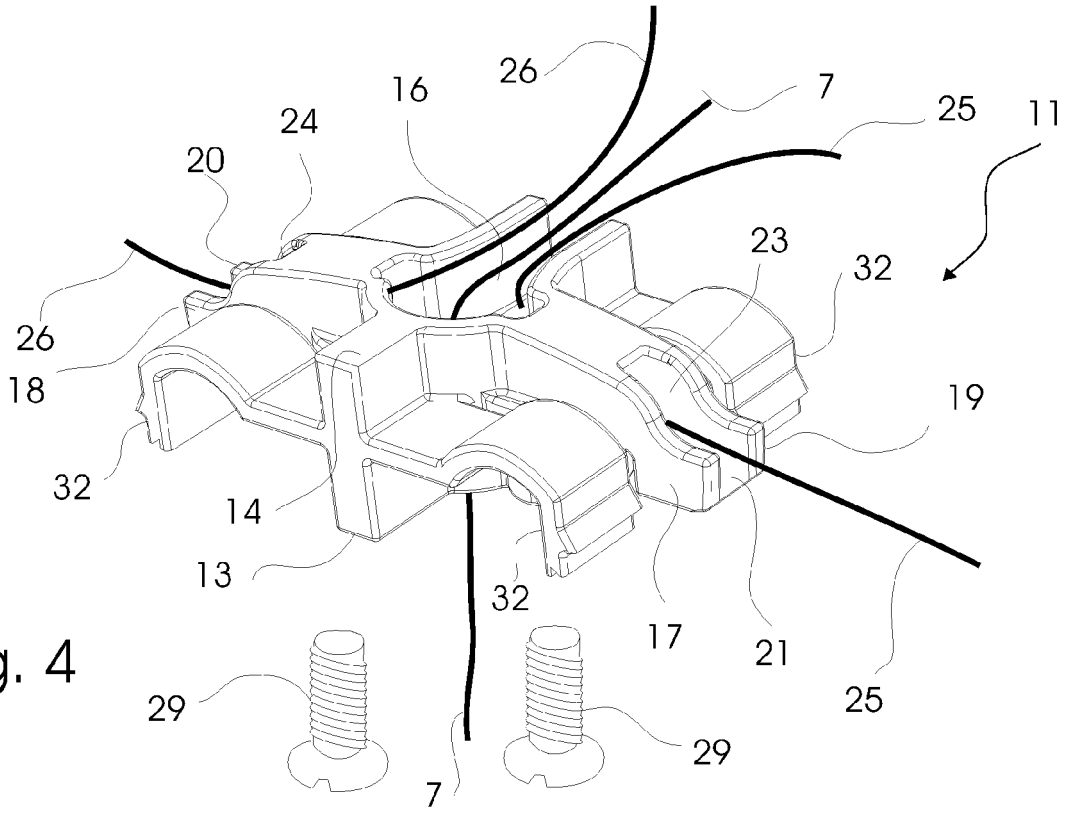
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Fig. 4

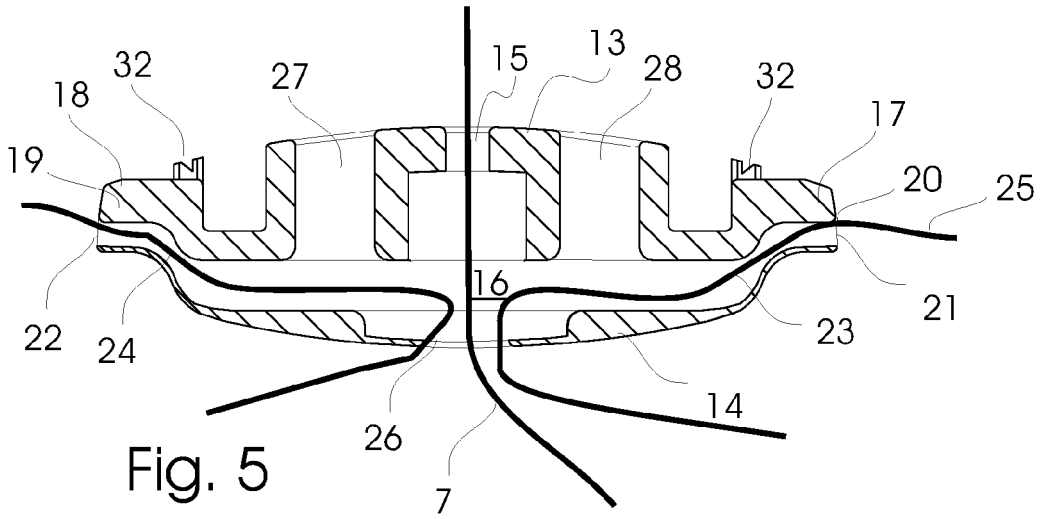
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Fig. 5

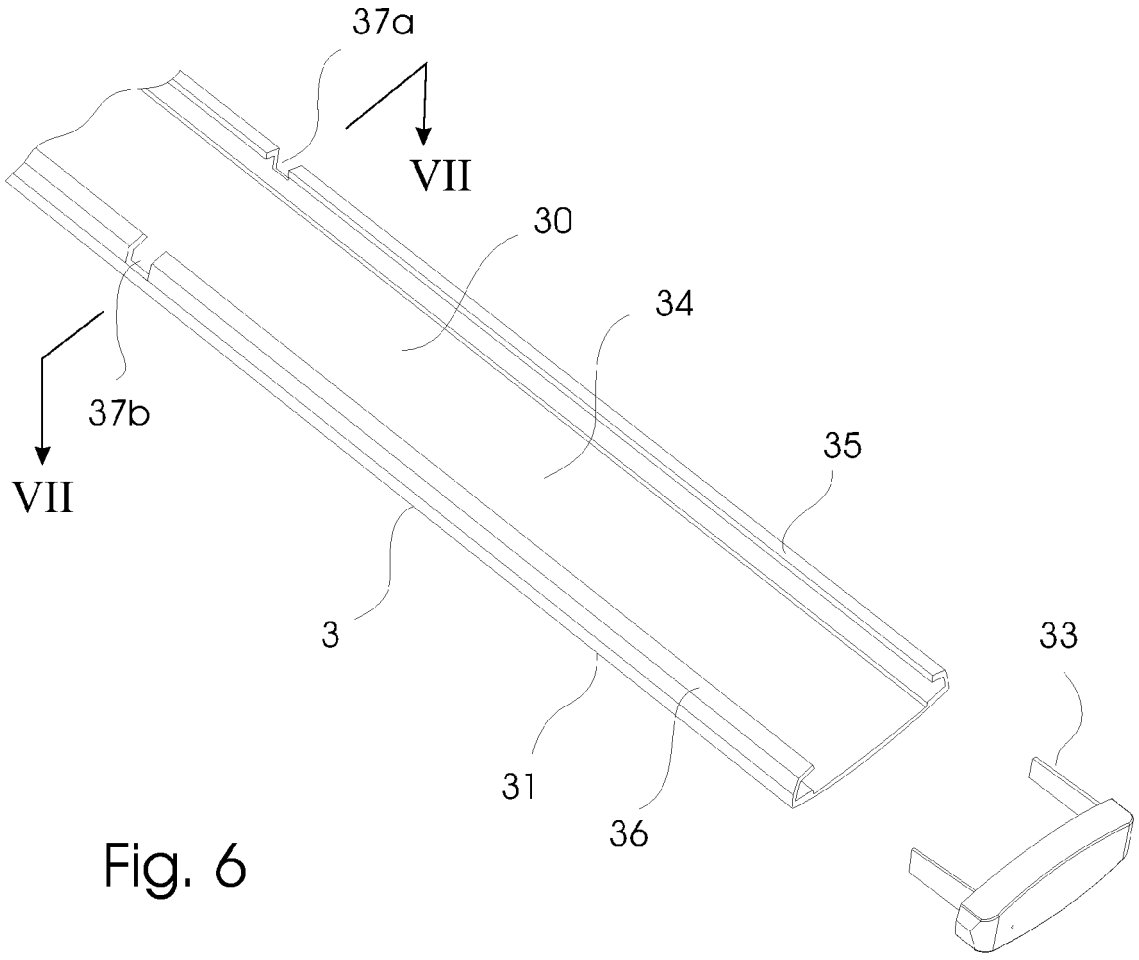
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Fig. 6

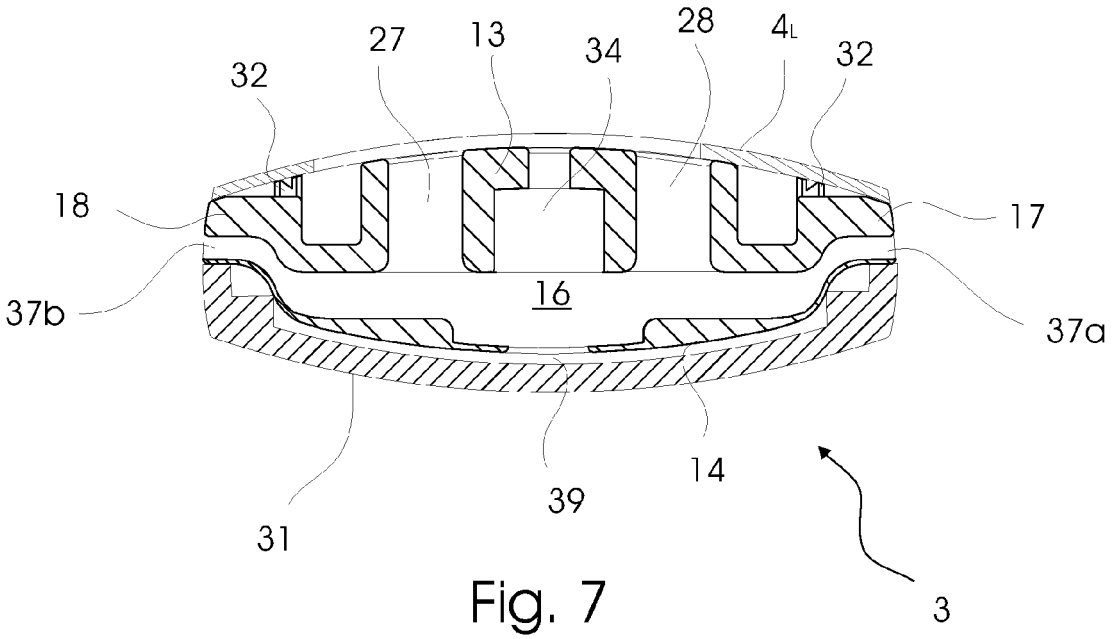

Fig. 7

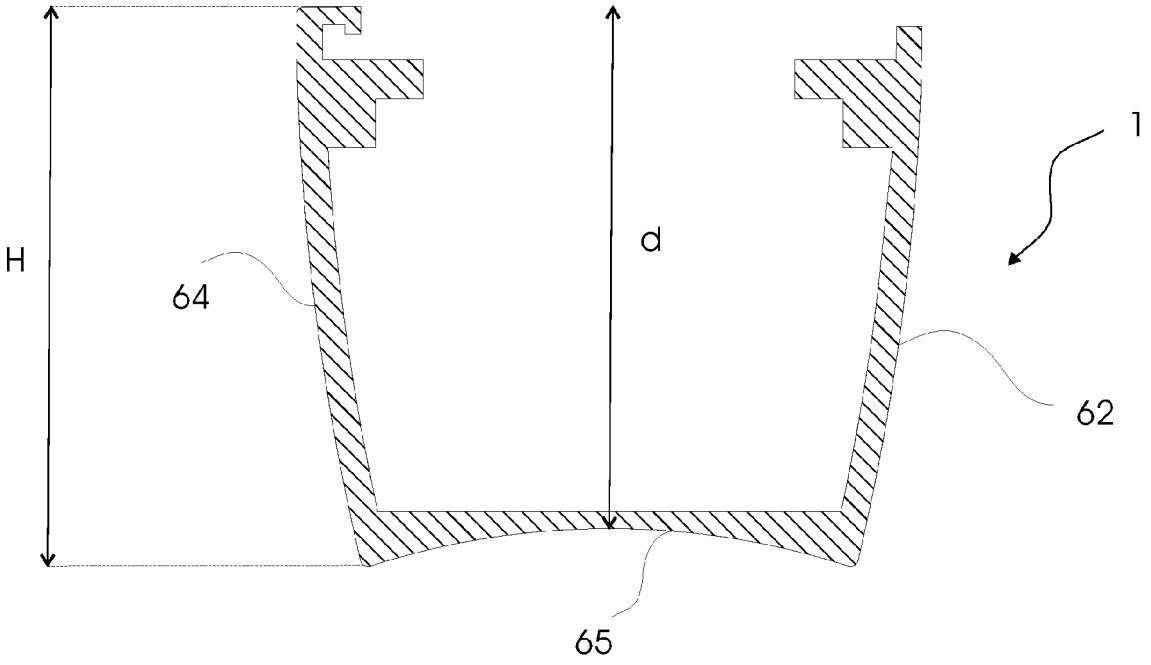

Fig. 14

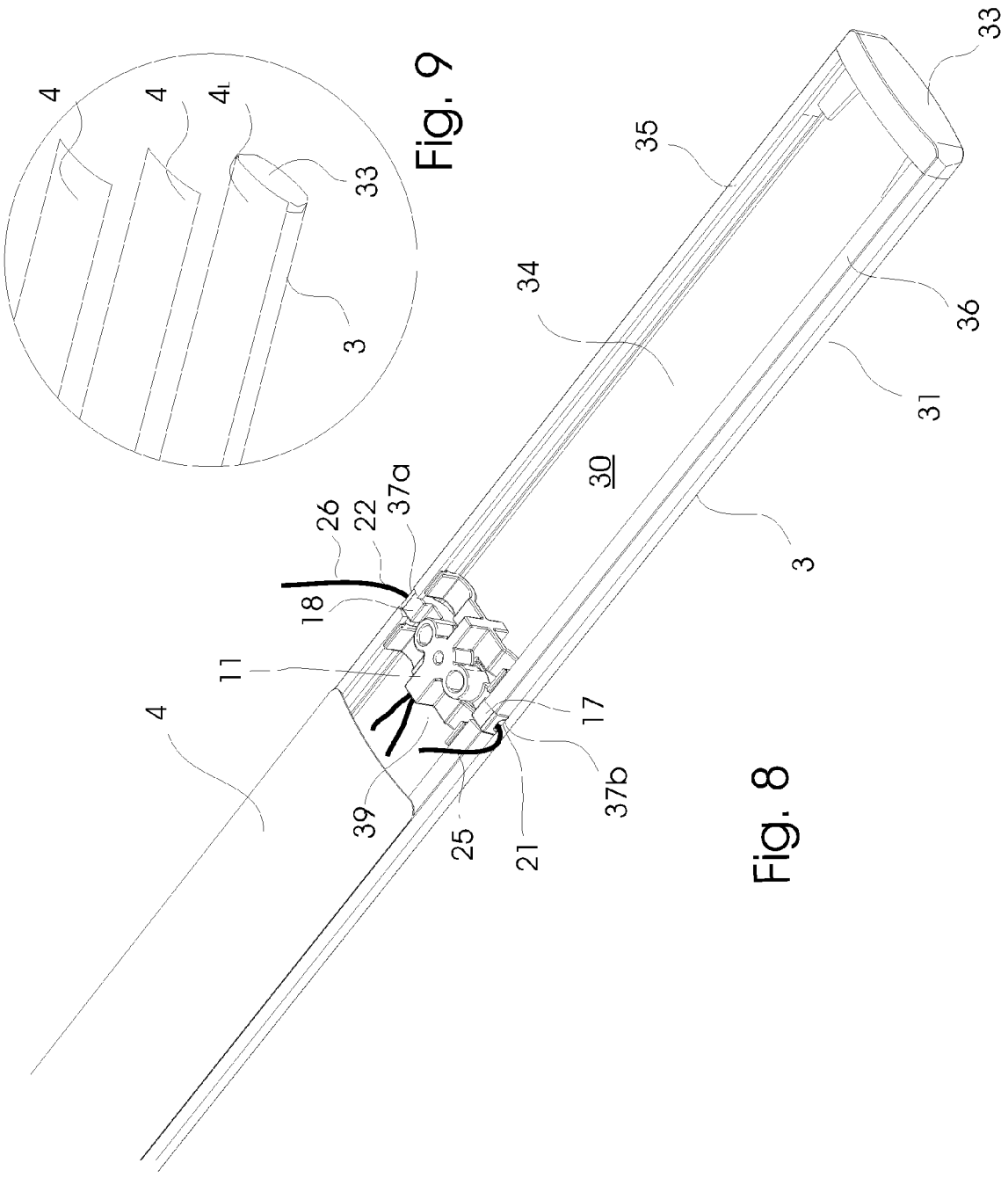

Fig. 9

Fig. 8

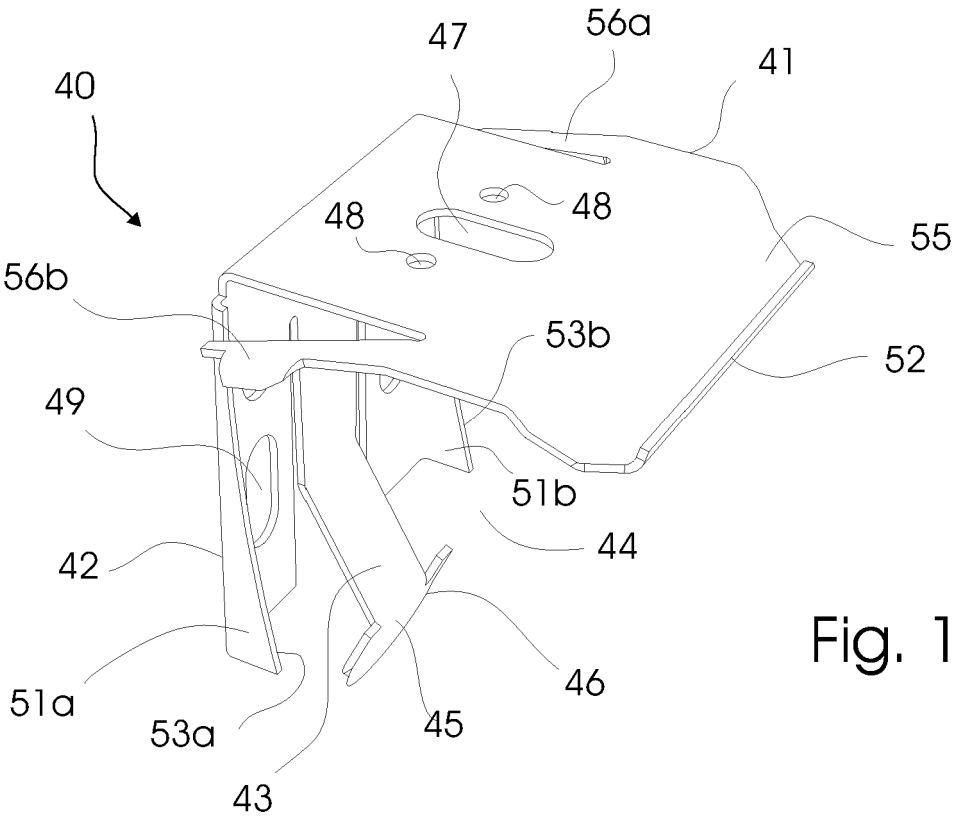
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Fig. 10

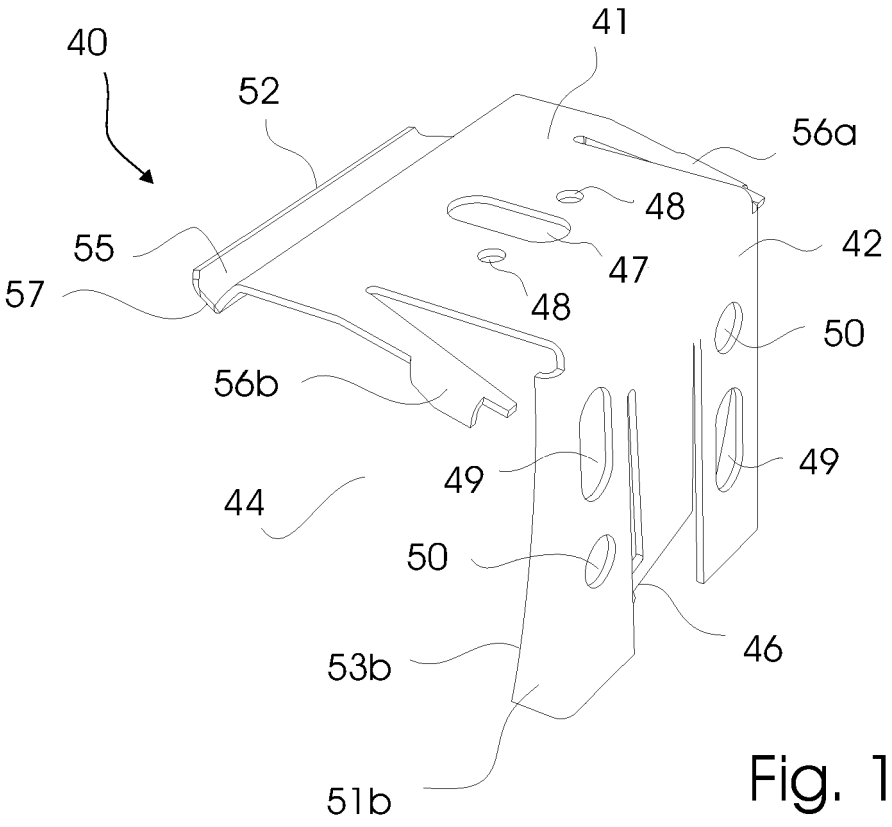
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Fig. 11

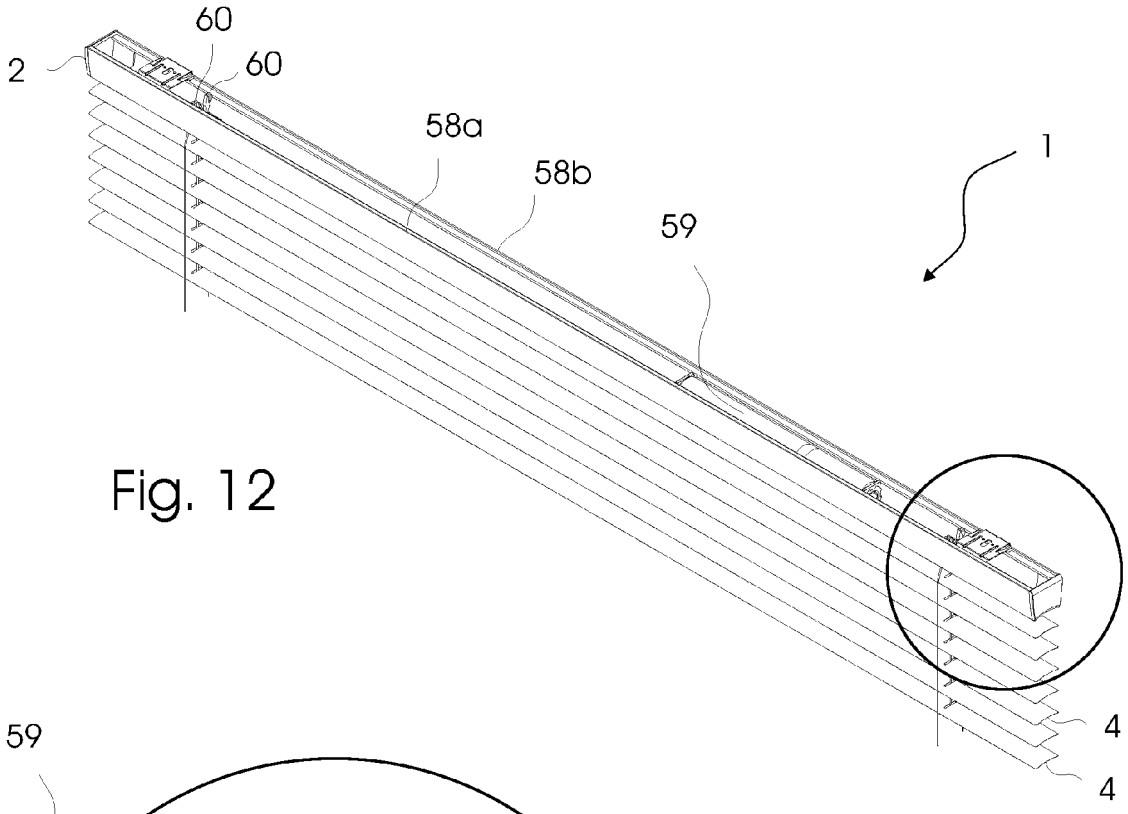

Fig. 12

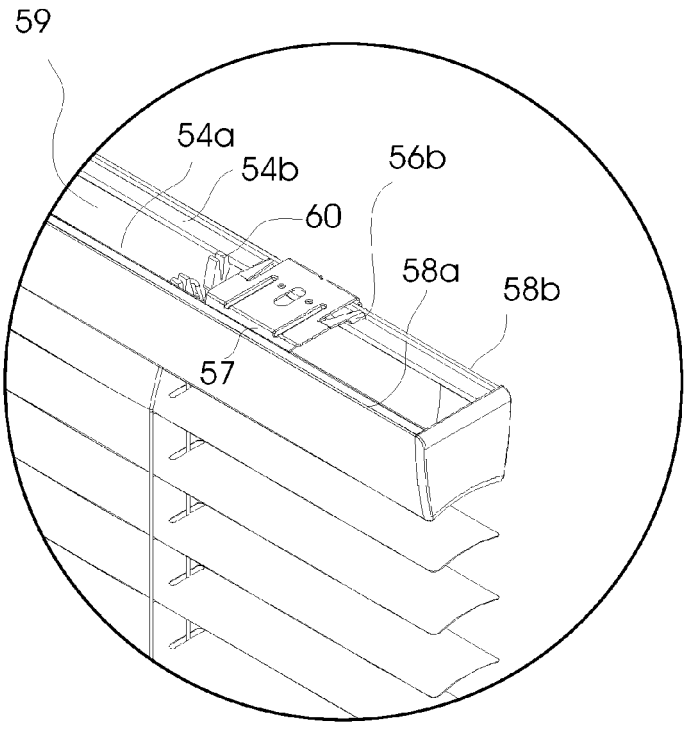

Fig. 12a

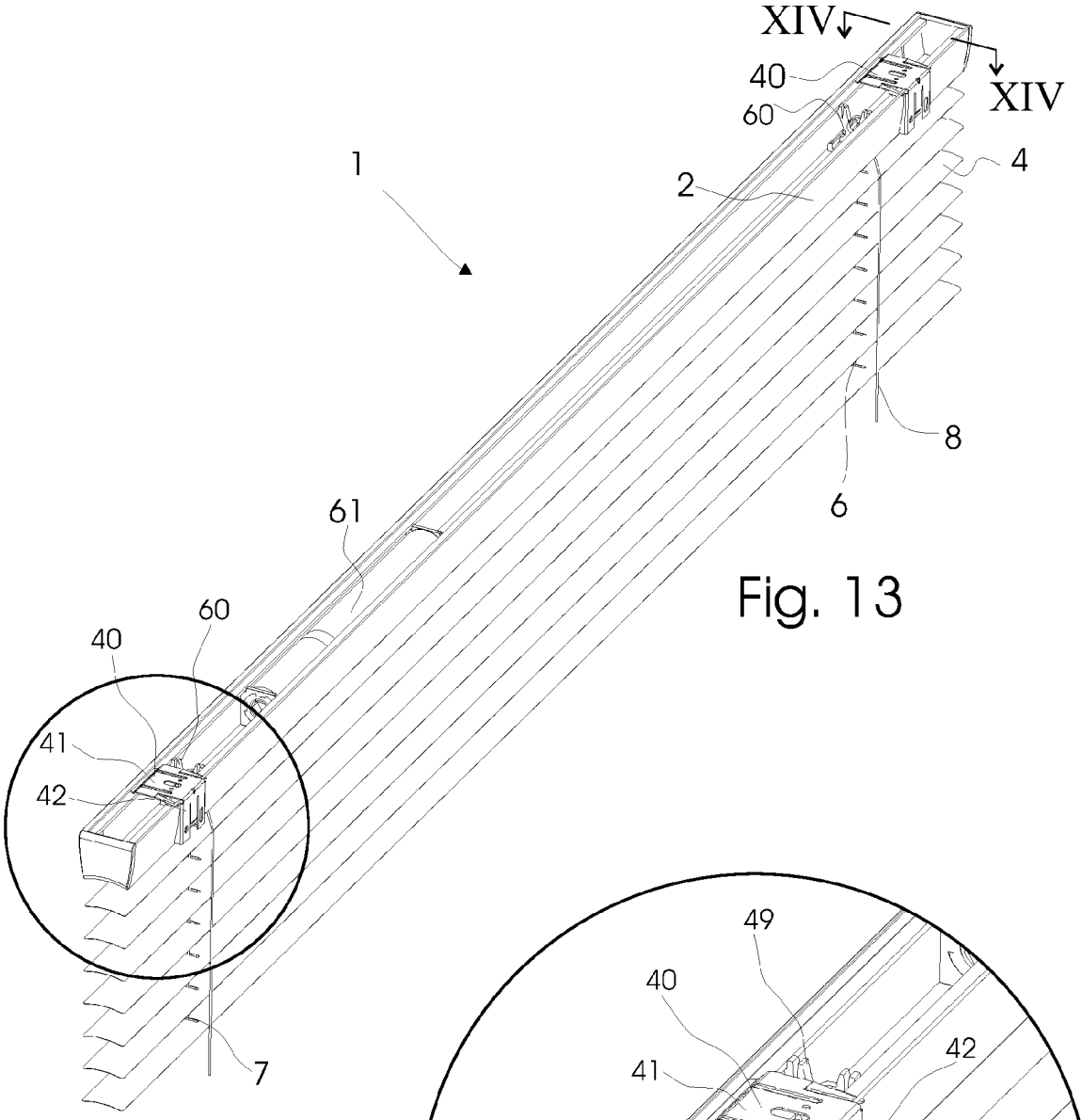

Fig. 13

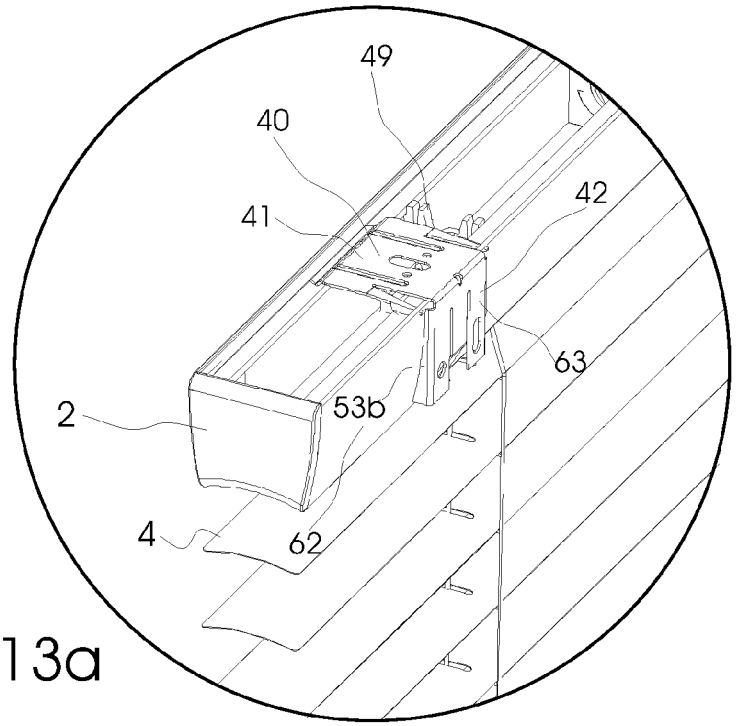

Fig. 13a

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EUROPEAN SEARCH REPORT

Application Number
EP 09 15 1819

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 918 656 A (DANIELS JAMES [US] ET AL) 6 July 1999 (1999-07-06) * column 4, line 22 - column 5, line 5; figures 4-7 *	1,2,7-9, 14-16	INV. E06B9/382 ADD. E06B9/388 E06B9/323
D,A	EP 1 808 567 A (HUNTER DOUGLAS IND BV [NL]) 18 July 2007 (2007-07-18)		
X	EP 1 624 149 A (HUNTER DOUGLAS IND BV [NL]) 8 February 2006 (2006-02-08) * paragraph [0021] - paragraph [0029]; figures 2-4 *	10-13,17	

TECHNICAL FIELDS SEARCHED (IPC)
E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 November 2009	Peschel, Gerhard

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

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Application Number
EP 09 15 1819

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 09 15 1819

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-9, 14-16

   A readjustable Venetian blind and method of configuring such a blind

   ---

2. claims: 10-13, 17

   Mounting means for a Venetian blind and supporting method for such a blind

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 09 15 1819

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-11-2009

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5918656 A	06-07-1999	CA 2230370 A1	11-09-1998
EP 1808567 A	18-07-2007	NONE	
EP 1624149 A	08-02-2006	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1808567 A1 **[0004]**
- EP 09151751 A **[0060]**