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(54) **System for fixing fittings on a shelf**

(57) A system for fixing fittings (3, 4), such as shelf dividers (3), forward-feed devices (4), holders for labels, trays, etc. on a shelf (1), which system enables a plurality of fittings to be removably fixed in various positions along the length of the shelf. The system comprises at least one fitting with an engaging part (33) and a fixing device (2) for receiving and holding the engaging part of a desired number of fittings, which fixing device is designed to extend in the longitudinal direction of the shelf and actuable for changing between a fixing state, in which engaging parts received in the fixing device are

held in a fixing position, and a releasing state, in which said engaging parts are released. The system is characterized in that the fixing device (2) is designed to enable it to be actuated by one engaging part (33) which is received in the fixing device for changing from the releasing state to the fixing state and/or from the fixing state to the releasing state.

The invention also relates to a fixing device and a fitting for such a system, a shelf with such a system and a shelf with such a fixing device and a method for fixing a fitting on a shelf and a method for releasing a fitting from a shelf.

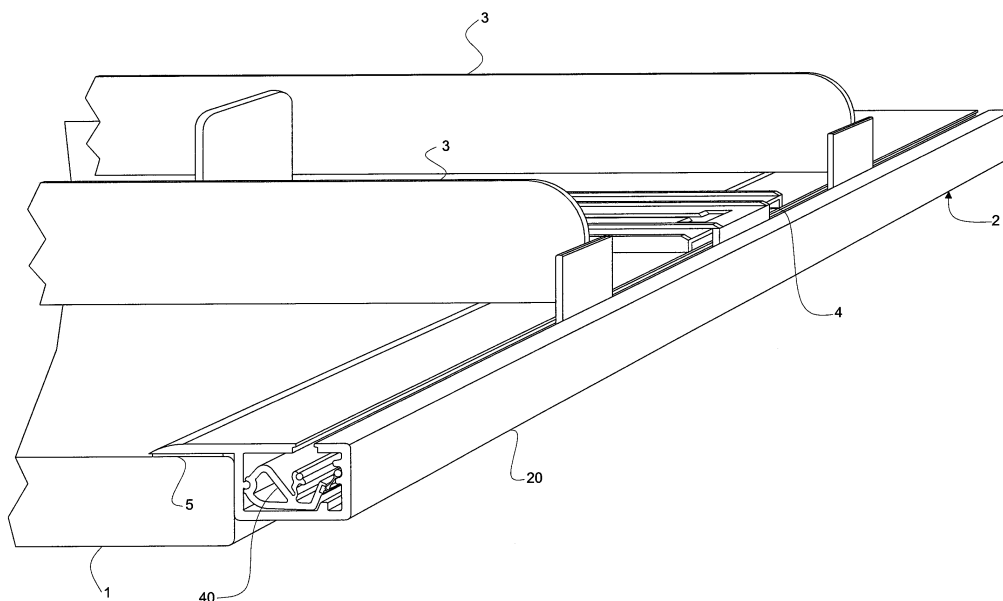


Fig. 1

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Description

Technical field

[0001] The present invention relates to a system for fixing fittings, such as shelf dividers, forward-feed devices, holders for labels, trays, etc., on a shelf, which system enables a plurality of fittings to be removably fixed in various positions along the length of the shelf, comprising at least one fitting with an engaging part and a fixing device for receiving and holding the engaging part of a desired number of fittings, which fixing device is designed to extend in the longitudinal direction of the shelf and actuable for changing between a fixing state, in which engaging parts received in the fixing device are held in a fixing position, and a releasing state, in which the engaging parts are released.

[0002] The invention also relates to a fixing device and a fitting for such a system, a shelf with such a system and a shelf with such a fixing device and a method for fixing a fitting onto a shelf and a method for releasing a fitting from a shelf.

Background of the invention

[0003] In, for example, convenience stores, goods are often displayed on shelves. In order to improve the display of the goods and in order to provide information about the goods and special offers, a number of different fittings are used, such as shelf dividers, various types of forward-feed devices, holders for banners and other labels, various types of product trays, etc. Such fittings are often attached to the shelves.

[0004] According to known technology, the fittings can be attached to the shelf in a number of different ways, for example mechanically using screws or the like, by frictional engagement or by adhesion with double-sided tape or like.

[0005] The arrangements that are used to attach fittings to the shelves should have some basic properties. An important property is that it should be possible to attach the fittings in any position along the length of the shelf, so that the distance between the fittings can be made any length in order to suit different packages and quantities of goods. In addition, the fittings should be attached to the shelf securely in order to avoid unintentional release or movement from their intended positions.

[0006] Shelf dividers are one example of fittings where the distance between the fittings can be particularly important. The shelf dividers often consist of partitions that are attached to the surface of the shelf, so that they extend at right angles to the longitudinal direction of the shelf and project up at right angles to the surface of the shelf. The main function of dividers is to separate different groups of product and to arrange the products on the shelves. Particularly when a forward-feed device for goods is placed between two shelf dividers, it is im-

portant that the shelf dividers are not moved toward each other even a short distance, as the friction between the goods and the dividers would then be so great that the forward-feed device would not work.

[0007] The attachment of the fittings should also ensure that they stand firmly, so that they do not tip over. In connection with this, it is of great importance that a secure fixing is provided, while at the same time the fixing arrangement enables the fittings to be attached and released easily.

[0008] A particularly desirable property is that it should be possible to fix a plurality of fittings to the shelf and remove a plurality of fittings from the shelf simultaneously with a single action. An arrangement that permits several fittings to be fixed or released simultaneously can be used, for example, when setting up shelf dividers on a new shelf or when reorganizing all or a large part of the shelf. When setting up shelf dividers on an empty shelf, the shelf dividers are normally placed first at estimated approximate positions along the shelf, taking into account the products that are to be placed on the shelf. The person carrying out the setting up normally starts at one end of the shelf and works along the shelf toward the other end. Once the other end of the shelf has been reached, it may be the case that there is not sufficient space to position a last shelf divider. All the previously placed dividers must then be adjusted by moving them a short distance in either direction in order to make room for the last shelf divider or in order to include the end of the shelf that has been left over. When carrying out these adjustments, it is a great advantage if the shelf dividers are not fixed to the shelf, so that they do not have to be removed and attached again. When the final positioning of the dividers has been carried out, it is desirable to be able to fix all the shelf dividers in their respective positions simultaneously by a single action. By this means, it is ensured in a simple way that none of the dividers tip up, are moved or become loose from their intended position while attaching them or during the subsequent stocking of the shelves with products.

[0009] It is also sometimes necessary to reorganize the shelf after the shelf has been arranged and the shelf dividers have been placed in their respective positions, so that one or a small number of the shelf dividers must be moved, removed, or attached. This is, for example, the case when the distance between two shelf dividers must be adjusted to suit a new product or product package with other dimensions. In addition, for example for special offers, it can often be desirable to be able to attach other fittings at a later date, such as labels and banner or coupon holders, on a shelf that has previously been arranged. In order to make it easier to carry out such reorganization of parts of a shelf that has already been arranged, it is therefore desirable for individual fittings to be able to be removed and to be attached in a new position and to be able to attach new fittings, without releasing other shelf dividers.

[0010] In addition, the arrangement for fixing fittings should be aesthetically pleasing, should not obstruct unnecessarily the stocking of the shelf or adjacent shelves with goods or the removal of goods from the shelf or adjacent shelves, and should be simple and cheap to manufacture and install.

[0011] Further more, it is desirable for the arrangement for fixing fittings to a shelf to be able to be applied directly onto existing shelves, without needing to replace or modify these existing shelves.

Previously known technology

[0012] US 5,657,702 describes a shelf with an arrangement for fastening a plurality of shelf dividers on the shelf. The arrangement comprises a generally U-shaped channel which is formed in the shelf and which extends along the front edge of the shelf, parallel to the longitudinal direction of the shelf. A locking rod is arranged in the channel, parallel to the longitudinal direction of shelf. The shelf dividers have a generally L-shaped cross-section, the vertical leg of which constitutes the actual divider and the horizontal leg of which rests on the shelf. One end of the horizontal leg has a flange which is bent downward, which flange is arranged to project down into the channel. The arrangement also comprises means for applying a locking force to the locking rod, so that the flange of the divider is locked between the locking rod and one of the walls of the channel. For this purpose, an operating device is arranged to make it possible to move the locking rod manually between a locking position and a releasing position. The operating device consists of manually operated levers, or screws that are operated manually by means of a screwdriver or a special tool.

[0013] The arrangement described in US 5,657,702 has the advantage that several shelf dividers can be fastened to the shelf by one and the same locking rod, and that all the shelf dividers can be locked or released simultaneously by operating one and the same operating device.

[0014] The arrangement according to US 5,657,702 has, however, also disadvantages relating to its design, operation and aesthetic qualities.

[0015] A problem with the arrangement described above is that it cannot be attached to a flat standard shelf, as a U-shaped channel for receiving the flange on the shelf divider and the locking rod must be constructed in the shelf. The arrangement can thus not be used on, for example, existing shop shelves without the surface of the shelf being replaced or undergoing complicated processing in order to form the U-shaped channel.

[0016] Another problem with the arrangement described above is that the locking and releasing of the shelf dividers can only be carried out by operating a lever or by the use of a separate tool. Where a lever is used, this constitutes an additional constructional component which spoils the aesthetic design of the shelf

and/or makes the integration of the arrangement into an existing standard shelf even more difficult. In addition, the lever requires room to move freely, which puts constraints on the design of the shelf and can mean that two shelves placed alongside each other have to be positioned with a certain minimum space between them. Where a separate tool is used, this is often inconvenient for personnel who are in charge of the shelf, as they must look after the tool and carry it with them in order to be able to work on the shelf. In addition, in this case the shelf must be provided with openings for the insertion of the tool, which openings detract from the aesthetic design of the shelf. If the arrangement is designed in such a way that the tool must be inserted from the side of the shelf, a minimum distance is also required between two shelves placed alongside each other. Arrangements where fittings are fastened on a shelf and released from the shelf by means of a separate operating device or a special tool thus involve complicated design solutions, problems in integrating the fixing arrangement into existing standard shelves, aesthetic disadvantages, inconvenience for the personnel in charge and/or restrictions in the ability to place several shelves close together alongside each other.

[0017] In addition, the known arrangement constitutes a relatively expensive and complicated design with many moving and interacting components.

[0018] The arrangement above also has a serious disadvantage that, in particular, makes the reorganization of shelves that have been already arranged more difficult. As all the shelf dividers are fixed to the shelf when the fixing rod is in its fixing position, it is not possible to move, removed or attach an individual shelf divider without first releasing all the dividers arranged on the shelf. There is accordingly a danger that the dividers which are not to be moved will also be displaced from their respective positions, fall over or become completely loose from the shelf.

[0019] An additional problem with the known arrangement described above is that the fixing of one or several shelf dividers cannot be ensured if the thickness of any one of the flanges on the shelf dividers deviates from the nominal manufacturing thickness. If one flange is thinner than other flanges, there is play between this flange and the fixing rod, so that the locking force cannot be transferred to this flange. If instead one flange is thicker than the other flanges, there is play between the fixing rod and the other flanges, whereby these will not be acted upon by any fixing force, or will only be acted upon by a small fixing force. A corresponding effect also arises, of course, if the thickness or straightness of the fixing rod varies along its length.

Brief description of the invention

[0020] An object of the present invention is therefore to provide a system for fixing fittings on a shelf, which system is easy to apply and use on already existing

shelves, for example in a shop, without the existing surfaces of the shelves having to be replaced or redesigned.

[0021] A second object is to provide such a system which is simple to manage and, using which, any number of fittings can be attached to the shelf or released from the shelf without the use of any special operating device or tool.

[0022] An additional object is to provide such a system that has a simple design with few components, is cheap to manufacture and is aesthetically pleasing.

[0023] These objects are achieved by a system of the type described in the first paragraph of this description, which system has the characteristics listed in claim 1.

[0024] With the system according to the invention, the fixing device can thus be made to change between the releasing state and the fixing state by the manipulation of one of the fittings, which fitting has engaging parts that are received in the fixing device. In this way, it is possible to fix any number of fittings on the shelf simultaneously by first placing fittings on the shelf in such a way that their engaging parts are received in the fixing device, when this is in the releasing state, and by thereafter quite simply pressing one of the fittings so that its engaging part assumes the fixing position. The fixing device then changes to the fixing state, whereupon all the engaging parts received in the fixing device assume the fixing position, so that the fittings are fixed on the shelf. In a corresponding way, all the fixed fittings can be released simultaneously by moving one of the engaging parts of the fittings from the fixing position in a direction toward the released position, whereby the whole fixing device resumes its releasing state, so that all the engaging parts and fittings are released. The system can be designed to allow a fitting to be able to be used to make either one or the other or both of these changes.

[0025] Accordingly, levers and other separate operating devices or tools are not needed in order to fix or release the fittings. This in turn means that the fixing device can be attached simply to already existing shelves of a standard type, as the shelves do not need to be modified in order to make room for such operating devices or tools. In addition, the handling of the system is made easier. The system according to the invention also has a simple design with few components and moving parts. By this means, high functional reliability is obtained, together with relatively cheap manufacture and great freedom to construct a design which makes it easier to integrate the system into existing shelf systems of a standard type and which is aesthetically pleasing.

[0026] Additional objects and advantages of the system according to the invention are described in the subordinate claims 2-11. For example, a fixing device may comprise an elongated groove for receiving engaging parts, which groove can move bistably between two functional positions which correspond to the fixing state and releasing state of the fixing device. The bistability of the groove means that a movement of the groove,

which is achieved when an individual engaging part is caused to act upon the fixing device to change the state of this, is propagated along the full length of groove, so that simultaneous changing of the state of the fixing device is ensured along its full operative length. By designing the groove so that it can be rotated around a longitudinal axis, a simple and space-saving way is achieved of making the groove exert a fixing force on the engaging parts received in the groove when the groove is moved from one functional position to the other functional position. If the axis of rotation of the groove is arranged to the side of the central axis of the groove, the fixing force can be increased.

[0027] In addition, the fixing device may comprise an elongated channel element in which the groove is arranged. The channel element forms an open channel in which the engaging parts can be inserted. By this means, a protected design is achieved where the sole moving part is essentially enclosed in the channel element. This design also enables the fixing device to be designed freely in such a way that it is aesthetically pleasing and can easily be integrated into existing shelf systems.

[0028] In order to make it easier to manage the arrangement of empty shelves and the reorganization of arranged shelves, the fixing device and the engaging parts can be designed in such a way that the engaging parts can be moved freely in a longitudinal direction and/or can only be taken out of the fixing device by rotating each individual fitting when the fixing device is in its releasing state. It is also possible to design the fixing device and the engaging parts in such a way that the engaging parts can be taken out of the fixing device by rotating each individual fitting and/or in such a way that the engaging parts can be pressed into the fixing position in the fixing device when the fixing device is in its fixing state.

[0029] In order to make it even easier to use the system according to the invention with existing shelves of a standard type, the fixing device can be provided with means for attaching the fixing device on a shelf. Examples of such means are double-sided adhesive tape, glue, snap-fit devices, screws, rivets and other mechanical devices such as a flange arranged on the shelf onto which the fixing device is pushed from the side.

[0030] The invention also relates to a fixing device and a fitting for use with a system according to the invention, and a shelf which comprises such a system, a shelf which comprises such a fixing device and a method for fixing fittings on the shelf and a method for releasing a fitting from a shelf. The fixing device, the fitting, the shelves and the methods are defined in the following claims 11-14, 15-20, 21, 22, 23 and 24 respectively.

Brief description of drawings

[0031] In the following, an exemplifying embodiment of the invention will be described with reference to the

attached drawings, in which:

Figure 1 is a perspective view of a shelf with a system according to the invention.

Figure 2 is a view from the side of a fixing device for a system according to the invention.

Figures 3a - 3d are a perspective view, a side view, a view from the back and a view from below of a fitting in the form of a shelf divider.

Figures 4a and 4b are side views of a fixing device and fitting showing these when the fixing device assumes its two different states.

Figures 5a and 5b are perspective views of a fixing device and a fitting and show removal of the fitting by rotating it when the fixing device assumes its two different states.

Figures 6a, 6b, and 6c are perspective view, a view from the bottom and a side view of a fitting according to another embodiment of the invention.

Figures 7a and 7b are side views of a fixing device according to another embodiment when the fixing device assumes its two different states.

Figures 8a and 8b are side views in correspondence to figures 7a and 7b and also shows the fitting according to figures 6a-c inserted.

Detailed description of embodiments of the invention

[0032] In the following description, directional and positional terms are used such as up, down, forward, backward, above, below, in front of, behind, upper, lower, front and back. The terms relate to directions and positions of a horizontal shelf or of components when they are attached to such a shelf. By the front edge of a shelf is meant here the edge of a shelf that is facing toward a person when the shelf is in normal use. The terms are used to make this description clearer and are not be regarded as limiting the extent of the protection provided by the claims.

[0033] Figure 1 shows a shop shelf 1 of a standard type which is provided with the system for fixing fittings according to an exemplifying embodiment of the invention. The system comprises a fixing device 2 and three fittings in the form of two shelf dividers 3 and a forward-feed device 4. The fixing device 2 is attached to the front edge of the shelf by a strip of double-sided adhesive tape 5.

[0034] The fixing device 2 consists of three parts; a channel element 20, a pivot member 40 and the strip of double-sided adhesive tape 5. The channel element 20

consists of an extruded profile element of aluminium. The pivot member 40 consists of a profile element of PVC and alcryn extruded together. The channel element 20 and the pivot member 40 can thus be manufactured very simply and at a low cost. At the same time, the construction provides great freedom in the design of the outside of the channel element 20, so that this is aesthetically pleasing and matches the shelf on which it is to be attached and matches other product-display components and shop-fitting components. By cutting the extruded parts, the fixing device can be manufactured in the lengths that suit different standard shelves, for example, 600, 900, 1200 and 1330 mm. If the system is to be used with shelves of other lengths, the fixing device is simply cut on site by means of a saw or hacksaw. Making lengths that deviate from standard can, of course, also be carried out during manufacture.

[0035] The mounting of the fixing device 2 is extremely simple and consists of inserting the pivot member 40 into the channel element 20 and applying the double-sided adhesive tape 5 to the channel element. The mounting of the fixing device 2 on a shelf is carried out by first removing a protective film from the double sided adhesive tape and then pressing the device onto the front edge of the shelf. The system thus requires no modifications or adaptation to the shelf upon which it is to be used.

[0036] Figure 2 shows an enlarged side view of the fixing device 2 shown in Figure 1. The fixing device 2 comprises an elongated channel element 20. The channel element 20 consists of an extruded profile element with a cross-section in the form of a channel 21 which is open at the top and has a generally rectangular cross-section. The channel 21 is delimited by a bottom wall 22, a back wall 23 and a front wall 24. At the top, the channel 21 is delimited by a back upper wall 25 and a front upper wall 26. The back upper wall 25 and the front upper wall 26 are separated by an opening 27 that extends along the whole length of the channel element. A mounting plate 28 extends horizontally backward from the back upper wall 25 and terminates at its rear end in a chamfer 28a. A strip of double-sided adhesive tape 5 is applied on the underside of the mounting plate.

[0037] A number of ribs are arranged on the walls of the channel element 20, so that they project inward into the channel and extend along the whole length of the channel element. A first rib 23a is arranged at approximately the centre of the back wall 23. A second rib 22a is arranged on the bottom wall 22. A third rib 24a is arranged at approximately the centre of the front wall 24 and a fourth rib 24b is arranged on the same wall 24 a short distance above the third rib 24a.

[0038] The pivot member 40 which is arranged inside the channel element 20 will now be described with reference to Figure 2. The pivot member consists of an extruded profile element with a cross-section that has a generally triangular section 41 and a generally U-shaped open section 42. The open section 42 is joined

to the triangular section 41 at the apex of the latter. A longitudinal groove 44 is arranged in the base of the triangular section 41 opposite the apex of the triangle. The pivot member 40 is arranged in the channel element 20 in such a way that the first rib 23a on the channel element projects into the groove 44. The pivot member 40 can thereby pivot inside the channel element around an axis A that runs through the first rib 23a. The U-shaped section 42 comprises a front leg 43 in the form of a straight wall, a bottom 50 and a back leg 45. The back leg 45 comprises a lower part 45a with a thinner thickness of material, an intermediate part 45b and an upper thicker part 45c. The upper part has an engaging rib 46 and a friction beading 47. The friction beading 47 consists of a beading of a relatively soft material, for example alcryn, which is co-extruded together with the rest of the pivot member. The U-shaped section 42 thus forms an open groove 48, which extends along the full length of the pivot member 40 and can rotate around the axis A that runs through the first rib 23a on the channel element 20.

[0039] A strip 49 is arranged at the free end of the straight wall 43, on the outer side of the wall facing away from the groove 48. The strip 49 comprises a mounting 49a in the straight wall 43. The mounting 49a is connected to an elastic bridge 49c via a hinge 49b. The bridge 49c has an area with thicker material 49d in the vicinity of the hinge 49b and a reinforcement 49e with a circular cross-section at the free end of the bridge 49c. The strip 49 extends along the full length of the pivot member 40 and is co-extruded together with this, with the mounting 49a, the hinge 49b, the bridge 49c and the area with thicker material 49d being made of a flexible material, such as alcryn, while the reinforcement 49e is made of a rigid material, for example PVC.

[0040] As shown by the description above and in Figure 2, the space in the channel element above the pivot member 40 is separated from the space below by the pivot member and the strip 49 extending from the back channel wall 23 to the front channel wall 24. By this means, any dirt and contaminants that enter the opening 27 are prevented from falling down to the bottom of the channel element and preventing the pivot member from moving downward to assume its lower functional position. In addition, in order to prevent the penetration of dirt and contaminants into the channel element, a contaminant barrier, such as bristles or a flexible film, can be arranged in or in the vicinity of the opening 27.

[0041] Figures 3a-3d show a fitting in the form of a shelf divider 3. The shelf divider comprises a partition 31 which, when mounted, extends at right angles to the longitudinal direction of the shelf and projects up at right angles to the surface of the shelf. A front plate 32 is arranged at the front edge of the shelf divider, at right angles to the partition 31. The front plate 32 is intended to prevent goods that are placed on the shelf between two shelf dividers from falling off the shelf. A part of the front plate 32 projects downward below the partition 31. This

part is intended to be inserted into and to be received by the fixing device 2 and constitutes the engaging part 33 of the shelf divider, here in the form of a foot. Certain shelf dividers and other fittings do not have a front plate.

The engaging part is then attached at the lower edge of the fitting, so that it projects downward and extends in a direction that is parallel to the longitudinal direction of the shelf when the fitting is fixed to the shelf.

[0042] The engaging part 33 shown in Figures 3a-d comprises a rectangular foot plate 34 which, in the example shown, constitutes a lower part of the front plate 32. The foot plate 34 projects approximately 20 mm downward from the lower edge 31a of the partition 31, which lower edge is intended to make contact with the upper surface of the shelf. The foot plate 34 extends parallel to the longitudinal direction of the shelf by approximately 15 mm on each side of the front edge 31b of the partition 31. An upper part of the foot plate 34, which part extends slightly downward from the lower edge 31a of the partition 31, has a uniform cross-section. On this part of the foot plate 34, the engaging part 33 has a lip 35, which is arranged on the back side of the front plate 34 and projects backward from this. The lip 35 is centred on the foot plate 34, directly below the partition 31 and has at its lower end a point which is directed downward. The point is arranged on a level with the lower limit of the upper part of the foot plate 34, which has a uniform cross-section.

[0043] On a level with the point, the engaging part 33 has an upper delimiting line 36a in a recess 36 which is open at the back and which is formed in the foot plate 34. The upper delimiting line 36a extends along the whole width of the foot plate 34, in a direction that is parallel to the longitudinal direction of the shelf when the engaging part is received in the fixing device. The recess 36 is delimited downward by a lower delimiting line 36b. Directly below the point of the lip 35, the lower delimiting line 36b has a mid part 36b' that is parallel to the upper delimiting line 36a. At the mid part 36b', the foot plate 34 is thicker than at the upper part of the foot plate that has a uniform cross-section, so that the mid part 36b' is positioned a short distance behind the upper delimiting line 36a. As shown by Figure 3b, the mid part 36b' is located approximately directly below the back delimiting surface of the lip 35. On both sides of the mid part, the lower delimiting line 36b has side parts 36b'' that extend upward and forward until they meet the respective side delimiting lines of the foot plate. The recess 36 is thus open at the back and at the sides of the engaging part. The depth of the recess 36 is constant along the width of the engaging part.

[0044] The recess 36 and the engaging part 33 below this thus form an engaging lug 37. The engaging lug 37 is uniform along a central part of the engaging part that corresponds to the mid part 36b' of the lower delimiting line 36 and, on both sides of this central part, there is a clearance 37a between the engaging lug and the sides of the engaging part. The clearances 37a are delimited

upward by the respective lower delimiting line 36b" of the recess 36 and downward by corresponding delimiting lines 36b'" that extend approximately from the mid part 36b' out toward the side edges of the foot plate 32 and that run directly below the lower delimiting lines 36b". At the central part, the engaging lug 37 has an outermost tip 37b that is located approximately directly below the back delimiting surface of the lip 35.

[0045] Below the recess 36, the foot plate 34 of the engaging part 33 tapers downward from the front and back sides of the foot plate, so that a tip 38 which points downward is formed at the lower end of the engaging part.

[0046] The function of the system will be described in the following with reference to Figures 4a and 4b. The fixing device 2 comprised in the system comprises the channel element 20 and the pivot member 40. Figure 4a shows the fixing device 2 when it is in its releasing state. The pivot member 40 with the groove 48 has then assumed its upper functional position. The strip 49 lies with its reinforcement 49e in contact with the front wall 24 of the channel element and is supported against the third rib 24a. The elastic bridge 49c holds up the pivot member 40 without being in compression from other than the weight of the pivot member 40. This is an advantage as unnecessary compression of polymer components can cause cold flow and deformation of the components. The groove 48 is then positioned directly below the opening 27 in the channel element 20.

[0047] In this releasing state, the engaging part 33 of a fitting can be inserted through the opening 27, so that the engaging part 33 is received inside the channel element 20 and the groove 48 in the pivot member 40. The opening 27 in the channel element is designed with such a width that the engaging part 33 passes freely between the end surfaces of the back upper wall 25 and the front upper wall 26. The distance between the engaging rib 46 in the groove 48 and the straight wall 43 is somewhat narrower than the opening 27. During the insertion, the engaging lug 37 on the engaging part 33 therefore comes into contact with the engaging rib 46. The force with which the bridge 49c holds up the pivot member is, however, large in relation to the rigidity of the lower narrow part 45a of the back leg 45. The narrow part therefore yields so that the back leg 45 is bent backward, whereby the engaging lug 37 can pass the engaging rib 46 without the pivot member rotating in a clockwise direction around the first rib 23a.

[0048] A desired number of fittings can be placed on the shelf in the way described above. In the releasing state shown in Figure 4a, each engaging part 33 can be moved freely along the groove 48, and hence along the shelf, to the desired position. Due to the engagement of the engaging rib 46 with the engaging lug 37 of the engaging part, the engaging parts are, however, prevented from being removed freely out of the groove 48 and the channel element 20. In order to release an engaging part 33 from the fixing device in the releasing state, the

engaging part 33 is rotated around a horizontal axis that is at right angles to the longitudinal direction of shelf, as shown in Figure 5a. As the engaging lug 37 is designed to have a clearance 37a between it and the ends of the engaging part 33, the engaging rib 46 and the back leg 45 are pressed progressively backward when an ever-greater part of the thickness of the engaging lug 37 comes into contact with the engaging rib 46 during this rotation. When the thickest part of the engaging lug 37, that is the tip of the lug 37b, has passed upward past the engaging rib 46, the engagement is released between the engaging rib and the engaging lug, whereby the engaging part and the fitting can be freely lifted away.

[0049] When the desired number of fittings have been placed in their intended positions, they are fixed in these positions by changing the fixing device from the releasing state to the fixing state shown in Figure 4b. This change is carried out by quite simply pressing one of the fittings downward toward the shelf.

[0050] When the fitting is pressed downward, the force is transferred from the fitting to the pivot member 40, by the tip 38 of the foot coming into contact with the bottom 44 of the groove 48. The force with which the elastic bridge 49c holds the pivot member 40 is overcome by the pressure force on the fitting. The pivot member 40 rotates in a clockwise direction around its axis of rotation A through the first rib 23a. The elastic bridge 49c is first compressed so that it curves forward and upward. The angle between the flexing point 49b and the straight wall 43 thus increases progressively. When the mounting 49a of the hinge 49b on the straight wall 43 of the groove 48 moves downward, it passes the contact line at which the reinforcement 49e is supported against the channel element 20. The strip 49 then undergoes an instantaneous change, with the flexing point 49b passing its bistability limit and the convexity of the bridge 49c changes to bending forward and downward. Following this, the reinforcement 49e on the strip is supported against the fourth rib 24 and the elasticity of the bridge 49c holds the pivot member downward, so that the lower side of the pivot member 40 comes into contact with and is supported against the bottom 22 of the channel element. Provided no anticlockwise force acts upon the pivot member, the strip 49 will not, however, be in compression.

[0051] The pivot member 40 and the groove 48 have now assumed their second stable functional position, as shown in Figure 4b. During the movement, the groove 48 rotates around the axis of rotation A through the first rib 23a. The engaging rib 46 and the friction beading 47 describe a circular movement in a clockwise direction with a radius that is defined by the distance from the engaging rib 46 or the friction beading 47 to the axis of rotation A through the first rib 23a. The engaging rib 46 also moves forward a short distance (to the right in the figure). The vertical position of the first rib 23a and the axis of rotation A is selected in relation to the distance

from the engaging rib 46 to the part of the lower side of the pivot member 40 that comes into contact with the channel element 20, so that the engaging rib 46 assumes a position where its displacement forward (to the right) in the channel element 20 approximately reaches a maximum when the groove 48 is in its second functional position. The engaging rib 46 then presses the engaging part 33 forward, so that an upper part 33a of the engaging part comes into contact with an end surface 26a of the front upper wall 26 of the channel element that faces toward the opening 27 in the channel element. By this means, an anticlockwise rotating force arises that acts upon the engaging part and the whole fitting. This rotating force is balanced by a reaction force in the opposite direction, which in the example shown arises along the contact line between the lower edge 31a of the shelf divider and the shelf or the upper surface of the channel element 20 behind the opening 27. By this means, frictional forces arise between, on the one hand, the engaging rib 46, the end surface 26a of the front upper wall 26 and the shelf, and/or the upper surface of the channel element behind the opening 27 and, on the other hand, the engaging lug 37 of the engaging part and/or the recess 36, the upper part 33a of the engaging part and the lower edge 31a of the shelf divider. These frictional forces fix the shelf divider to the shelf.

[0052] In order to strengthen further the fixing of the engaging part and the fitting, the lip 35 of the engaging part interacts with the friction beading 47. At the same time as the groove assumes its second functional position and the engaging rib 46 engages with the engaging lug 37, the lip 35 and the friction beading come into contact with each other, due to their movements in relation to each other. The lip 35 then cuts in to the relatively soft friction beading 47. By this means, a combined mechanical and frictional locking is achieved between the lip 35 and the friction beading 47.

[0053] Figure 5b shows how, in the same way as in Figure 5a, individual fittings can be removed from the fixing device by rotating them, even when the fixing device is in its fixing state. Also in this state, the clearance 37a of the engaging lug 37 contributes to making such a removal by rotating possible.

[0054] The fixing device can be changed from the fixing state shown in Figure 4b to its releasing state by pulling a fitting directly upward from its fixing position. As the engaging part 33 is not then rotated, the thickest part of the engaging lug 37 will act simultaneously upon the engaging rib 46 along an extent that corresponds to the mid part 36b' of the lower delimiting line 36b of the recess 36. The clearance 37a of the engaging lug 37 is then prevented from progressively pressing away the engaging rib and the back leg of the groove 48. In this way, the force with which the bridge 49c of the strip 49 resists the counter clockwise rotation of the pivot member 40 is overcome. When the pivot member 40 is rotated counter clockwise, the strip will undergo a transformation that is the opposite to the transformation de-

scribed above when the fixing device is changed from the releasing state to the fixing state. The fixing device assumes accordingly the releasing state and all the engaging parts received in the fixing device are released.

[0055] The design of the back leg 45 of the U-shaped section 42 and, in particular, its part 45a with a smaller thickness of material, is of significance for the function of the fixing device. The rigidity of this part 45a must be adapted in relation to the elasticity of the bridge 49c and the geometry of the engaging rib and the engaging lug in order to allow the back leg 45 to be bent backward without the bridge 49c yielding when an engaging part is inserted in the groove 48 when the fixing device is in its releasing state. At the same time, the part 45a must be sufficiently rigid to enable the counteracting force of the bridge 49c on the pivot member 40 to be overcome without the leg being bent backward when an engaging part is drawn up from its fixing position in order to change the fixing device from its fixing state to its releasing state.

[0056] In order to ensure good functioning of the fixing device, it is also of significance to ensure that the fixing device 2 is changed simultaneously from one state to the other along its full length, when a fitting is used to act upon the fixing device to change it. The fixing device is specially designed to achieve this. For example, the bistability of the pivot member and hence of the groove contributes to a changing force which is applied locally at any position along the pivot member 40 being propagated practically instantaneously along the full length of the pivot member. In addition, the rigidity of the pivot member in the longitudinal direction and its torsional rigidity are of significance. In order to achieve satisfactory torsional rigidity of the pivot member, this should essentially be constructed in a rigid material, for example PVC, other rigid polymers or aluminium. At the same time, certain parts of the pivot member, such as the friction beading, the lower part of the back leg and the bistability strip should have other, non-rigid, characteristics. This can, as mentioned above, be achieved by coextruding different materials together, and/or by designing these parts with reduced thickness of material. The geometry of the pivot member is also of significance for its rigidity. For example, the generally triangular back section 41 illustrated and described above is particularly designed to provide great rigidity.

With reference to figures 6a-c, 7a-b and 8a-b a preferred embodiment of the invention is described below. Since many of the features of this embodiment are similar to those of the embodiment described above, only features which differs from the ones described above will be described here.

[0057] The fitting 103 which also constitutes a divider comprises a front plate 132 which projects downwards where it exhibits an engaging part 133. At this engaging part 133 the lip 35 (see fig. 3a, 3b) is replaced by a rim 135 which projects backward from the engaging part 133 and which comprises an friction surface 135a facing

backwards. The rim 135 and friction surface 135a extends, when inserted, generally parallel to the longitudinal direction of the groove 148 and over the entire widths of the engaging part 133.

[0058] The pivot member 140 comprises a generally U-shaped section 142 and a generally triangular section 141 and resembles to a large extent the pivot member 40 described above. However, the friction beading 147 of this embodiment is more elongated in the direction away from the upper thicker part 145 of the back leg 145 and is formed of softened PVC, which is co-extruded together with the rest of the pivot member 140..

[0059] A second friction bead 160 is arranged inside the groove 148, just above the junction between the front leg 143 and the bottom 150. The cross section of the second friction bead 160 is formed as a lateral half of a drop, i.e. the lower portion is wither than the upper portion.

[0060] When the engaging part 133 is engaged in its fixing position (fig. 8b) in the pivot member 140, the friction surface 135a comes in contact with the elongated friction bead 147. Since the contact are between these two members is relatively large, the friction between them is also large, whereby longitudinal movement of the fitting along the self is prevented in an efficient and secure manner. Further more this large friction also prevents the engaging part to be rotated around a horizontal axis perpendicular to the longitudinal direction of the groove 148. Hereby, also tilting of the fitting is prevented. During the change over from the releasing state to the fixing state of the pivot member 140, the elongated shape of the friction bead 147 allows the friction bead to elastically flex backwards so that the friction bead which is incompressible does not hinder the engaging part from reaching its fixing position. When the engaging part 133 is in its fixing position position, the tip 138 of the engaging part makes contact with the second friction bead 160. This contact also increases the friction between the fitting 103 and the fixing device 102 whereby longitudinal movement of the fitting is further prevented when the engaging part is in its fixing position. The drop-form of the second friction beading together with the rounded shape of the tip 138 facilitates and ensures that the engaging part 133 actually reaches its correct fixing position when the pivot member 140 is changed from its releasing state to its fixing state.

[0061] The strip 149 of the pivot member 140 comprises a mounting 149a, a first hinge 149b, an elastic bridge 149c, a second hinge 149f and a mounting strip 149e. For securely holding the strip 149 with the bridge 149c in the correct position the mounting strip I received in a mounting groove 161, which is formed in the front wall 124 of the channel element 120. Since the mounting strip 149c is fixed in the mounting groove 161 the distal end from the groove 148 cannot pivot. Therefore the second hinge 149f is arranged at the joint between the bridge 149c and the mounting strip 149e, for allowing free bistable change over of the bridge 149c. In this em-

bodiment the bridge 149c is made of the elastomer TPU and the mounting strip 149e of PVC which are co-extruded together with the rest of the pivot member which also is made of PVC. During manufacturing the bridge may be formed such that its cross section has a slight preformed downward convex curvature in order to assure that the bridge during its bistable transition curves downwards. This may be an advantage when the available space above the channel element above the bridge is limited.

[0062] The first rib 123a, which is arranged at the back wall 123 of the channel element 120 and which defines axis A around which the pivot member rotates, is in this embodiment not rounded but pointed. By this means the friction between the first rib 123a and the 144 longitudinal groove 144 of the pivot member is decreased during the transition movement of the pivot member 140. Hereby, a smaller force is needed for causing the change of the fixing device between the fixing state and the releasing state. Further more, this smaller friction contributes to ensuring that the entire length of the pivot member 140 undergoes the transition when it is actuated for changing state by a fitting which acts on the pivot member at any position along its entire and that the transition takes place essentially simultaneously for the entire pivot member.

[0063] The invention is not to be regarded as being limited to the embodiments described above, but can be varied within the scope of the following claims. For example, a system that is intended to be fixed on a horizontal shelf has been discussed. It is, however, recognized that the system can also be used with shelves that are at an angle to the horizontal plane.

[0064] In addition, instead of being arranged in the channel element in such a way that it can rotate, a groove can be bistably suspended by means of a front and a back link arm, which link arms interact with the front and the back walls respectively of the channel element, in order to enable the groove to move bistably vertically inside the channel element between two functional positions. The engaging parts of the fittings can be inserted through a central upper slot in the channel element and snapped fast in the groove when this is in its upper releasing position, whereby the fittings are free to be moved in the longitudinal direction of the groove. By pressing down one of the fittings, the whole groove is caused to be changed to its second lower functional position. All the engaging parts received in the groove are then drawn down to a lower fixing position. In the fixing position, the fittings are locked so that they cannot be moved in the longitudinal direction, for example by a lower edge of the fitting coming into contact with and being pressed against a friction strip or the like on the top side of the shelf or fixing device. Alternatively, longitudinal movement can be prevented in the fixing position by the engagement between male and female parts on the fittings and on the shelf or fixing device respectively, or in some other way. This embodiment has, how-

ever, for example the disadvantage that the front link arm prevents the slot in the channel element for the insertion of the engaging parts being positioned at the front edge of the channel element. Such a forward positioning of the slot in the channel element is often desirable, among other things as it is an advantage to be able to design the engaging part as an extension of a front plate on the fitting.

[0065] According to another embodiment, the groove can be designed to rotate around an axis of rotation arranged at the side of the groove, as described above with reference to the figures. The bistability of the groove is achieved here, however, by means of a cam surface which is arranged on the front wall of the channel element and which is curved backward inside the channel element. A cam follower is arranged on the groove and is designed to slide elastically over the cam surface in order to enable the groove to snap bistably between an upper and a lower functional position when the groove is rotated. Alternatively, the cam surface and the cam follower can be placed the other way round. This embodiment involves a relatively simple design with few moving parts. At the same time, it has, however, the disadvantage of being sensitive to dirt and other contaminants entering the channel element and increasing the friction between the cam surface and the cam follower, so that the movement of the groove is made more difficult or is made impossible.

[0066] Irrespective of the embodiment of the groove and the pivot member, the channel element can be constructed, for example, of aluminium, PVC or other polymer material, preferably of such a type that is suitable for being extruded.

[0067] In order to increase further the rigidity of the pivot member, a reinforcing rod or the like of rigid material can be inserted in the pivot member, for example in the triangular section.

[0068] The ends of the channel element can terminate in end caps or covers that are threaded on or snapped on, for example to prevent the penetration of dirt or for aesthetic reasons.

[0069] In the embodiment described above with reference to the figures, the fittings consist of shelf dividers. The fittings can, however, also consist of, for example, forward-feed devices, holders for banners, coupons and other labels, various trays or the like. Within the scope of the invention, the fittings can also comprise a tool that is used essentially to carry out the changes to the fixing device that are described above. The invention enables fittings of different kinds to be able to be fixed on one and the same shelf and this is of course covered by the invention.

Claims

1. A system for fixing fittings (3, 4), such as shelf dividers (3), forward-feed devices (4), holders for la-

bels, trays, etc., on a shelf (1), which system enables a plurality of fittings to be removably fixed in various positions along the length of the shelf, comprising at least one fitting with an engaging part (33) and a fixing device (2) for receiving and holding the engaging part of a desired number of fittings, which fixing device is designed to extend in the longitudinal direction of the shelf and actuable for changing between a fixing state, in which engaging parts received in the fixing device are held in a fixing position, and a releasing state, in which said engaging parts are released, **characterized in that** the fixing device (2) is designed to enable it to be actuated by one engaging part (33) which is received in the fixing device for changing from the releasing state to the fixing state and/or from the fixing state to the releasing state.

2. The system as claimed in claim 1, wherein the fixing device (2) is designed to be able to be changed by said engaging part (33) being moved from its released position to its fixing position or from its fixing position to its released position.

3. The system as claimed in claim 1 or 2, wherein the fixing device (2) comprises a groove (48) for receiving engaging parts (33), which groove extends in the longitudinal direction of the fixing device and can be moved between two functional positions, which functional positions define the fixing state and the releasing state of the fixing device.

4. The system as claimed in claim 3, wherein the groove (48) is bistably movable between its two functional positions.

5. The system as claimed in claim 3 or 4, wherein the groove (48) can move in such a way that it rotates around an axis (A) that extends parallel to the longitudinal direction of the groove.

6. The system as claimed in any one of claims 3 - 5, wherein the fixing device (2) comprises an elongated channel element (20) that extends in the longitudinal direction of the fixing device and that has a longitudinal opening (27) to create an open channel for receiving engaging parts (33) and wherein the groove is arranged inside the channel.

7. The system as claimed in any one of claims 1 - 6, wherein the fixing device (2) and the engaging part (33) are designed in such a way that longitudinal movement of an engaging part received in the fixing device is made possible when the fixing device is in its releasing state and is prevented when the fixing device is in its fixing state.

8. The system as claimed in any one of claims 1 - 7,

wherein the fixing device (2) and the engaging part (33) are designed to enable individual engaging parts received in the fixing device to be released by rotating the respective engaging part when the fixing device is in its fixing state.

9. The system as claimed in any one of claims 1 - 8, wherein the fixing device (2) and the engaging part (33) are designed to enable an engaging part to be inserted into the fixing device to its fixing position when the fixing device is in its fixing state.
10. The system as claimed in any one of claims 1 - 8, wherein the fixing device (2) and the engaging part (33) are designed to prevent an engaging part received in the fixing device from being taken out of the fixing device, unless a rotating force is exerted upon the engaging part, when the fixing device is in its releasing state.
11. The system as claimed in any one of claims 1 - 10, wherein the fixing device (2) comprises means (5) for attaching the fixing device to a shelf (1).
12. A fixing device (2) for a system according to any one of claims 1 - 11, comprising an elongated channel element (20) which is designed to be arranged in the longitudinal direction of the shelf (1) and which has a longitudinal opening (27) to create an open channel for receiving a required number of engaging parts (33), which fixing device is actuable for changing between a fixing state, in which engaging parts received in the fixing device are held in a fixing position and a releasing state in which the engaging parts are released, **characterized by** a groove (48) for receiving the engaging parts, which groove extends in the longitudinal direction of the fixing device and is movable between two functional positions, in which functional positions the fixing device assumes its releasing state or its fixing state.
13. The fixing device as claimed in claim 12, wherein the groove (48) is bistably movable between its two functional positions.
14. The fixing device as claimed in claim 12 or 13, wherein the groove (48) can be rotated around an axis (A) that runs parallel to the longitudinal direction of the groove.
15. A fitting for a system as claimed in any one of claims 1 - 11, comprising an engaging part that is designed to enable it to be received and held by a fixing device that is arranged on the shelf and that extends in the longitudinal direction of the shelf, **characterized in that** the engaging part (33) comprises means for causing the fixing device (2) to change from a releasing state, in which engaging parts re-

ceived in the fixing device are released, to a fixing state, in which engaging parts received in the fixing device are held in a fixing position, when the engaging part of the fitting is moved from its released position to its fixing position, and/or changing from the fixing state to the releasing state when the engaging part is moved from the fixing position to the released position.

16. The fitting as claimed in claim 15, wherein the means for causing the change of state comprise a part of the engaging part that is designed to be received and held by a groove (48) that is arranged in the fixing device.
17. The fitting as claimed in claim 16, wherein the means for causing the change of state comprise carrier members that are designed to interact with corresponding members of the groove (48) in order to move the groove between two operational positions, when the engaging part (33) is moved relative to the fixing device (2).
18. The fitting as claimed in claim 17, wherein the carrier members comprise a free end (38) of the engaging part (33) and an engaging lug (37).
19. The fitting as claimed in claim 18, wherein the engaging lug (37) has clearances (37a) for facilitating removal of the engaging part (33) from the groove (48) when the engaging part is received in the groove.
20. The fitting as claimed in any one of claims 15 - 19, comprising a lip (35) which is arranged to prevent movement of the engaging part (33) along the groove (48) when the engaging part is in its fixing position and to allow such movement when the engaging part is in its released position.
21. A shelf comprising a system according to any one of claims 1 - 11.
22. A shelf comprising a fixing device according to any one of claims 12 - 14.
23. A method for fixing fittings, that are provided with engaging parts, on a shelf that has a fixing device which is actuable for changing between a fixing state, in which engaging parts received in the fixing device are held in a fixing position, and a releasing state, in which the engaging parts are released, comprising placing a required number of fittings on the shelf, when the fixing device is in its releasing state, so that an engaging part of each fitting is received in the fixing device, **characterized in** causing the fixing device, by applying a force to one of said fittings, to change to the fixing state so that en-

gaging parts received in the fixing device are held in the fixing position.

24. A method for releasing a number of fittings from a shelf, which fittings are provided with engaging parts that are received and held in a fixing position in a fixing device which is actuatable for changing between a fixing state, in which engaging parts received in the fixing device are held in that the fixing position, and a releasing state, in which the engaging parts are released, **characterized in** causing the fixing device, by applying a force to one of said fittings, to change from the fixing state to the releasing state so that engaging parts received in the fixing device are released.

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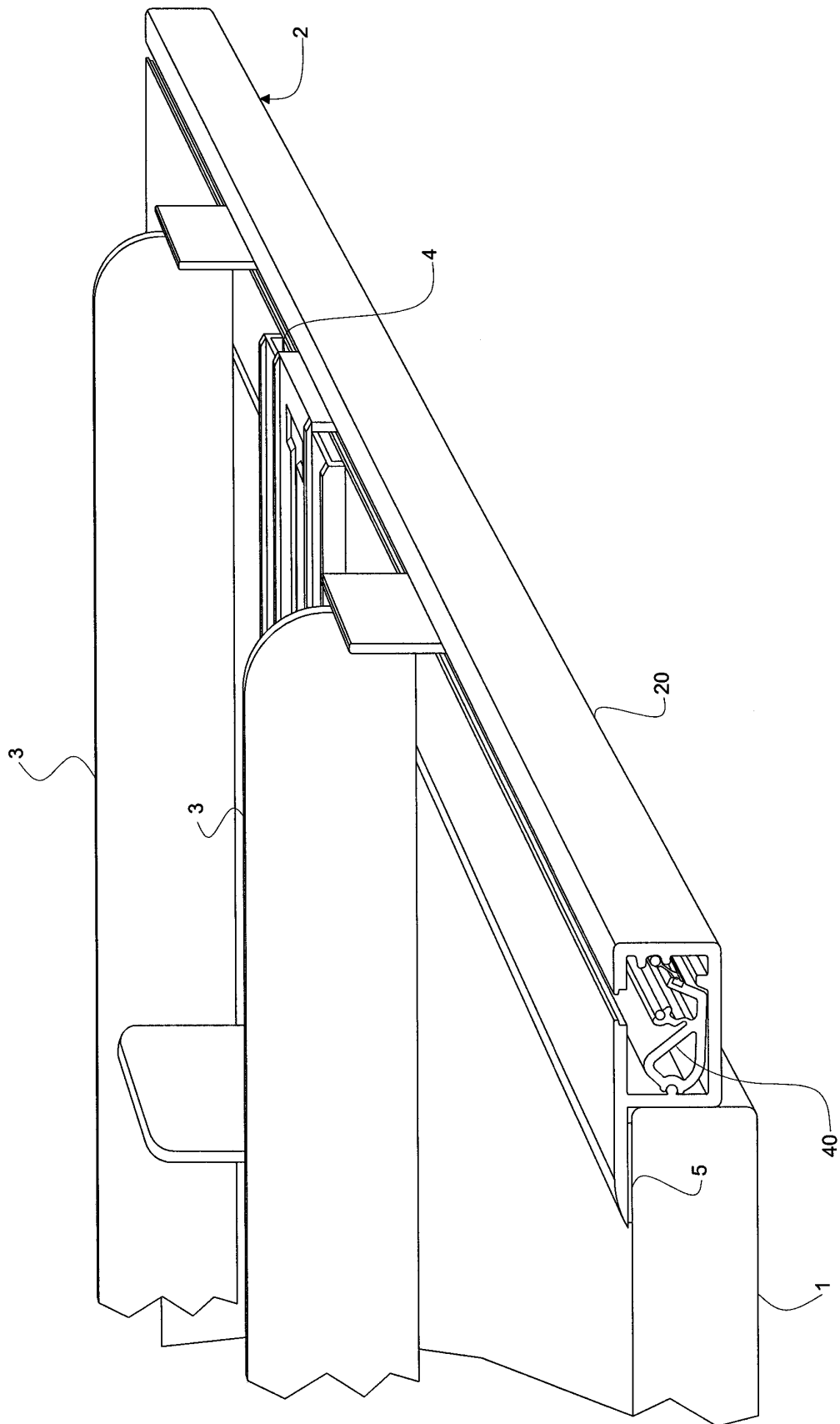


Fig. 1

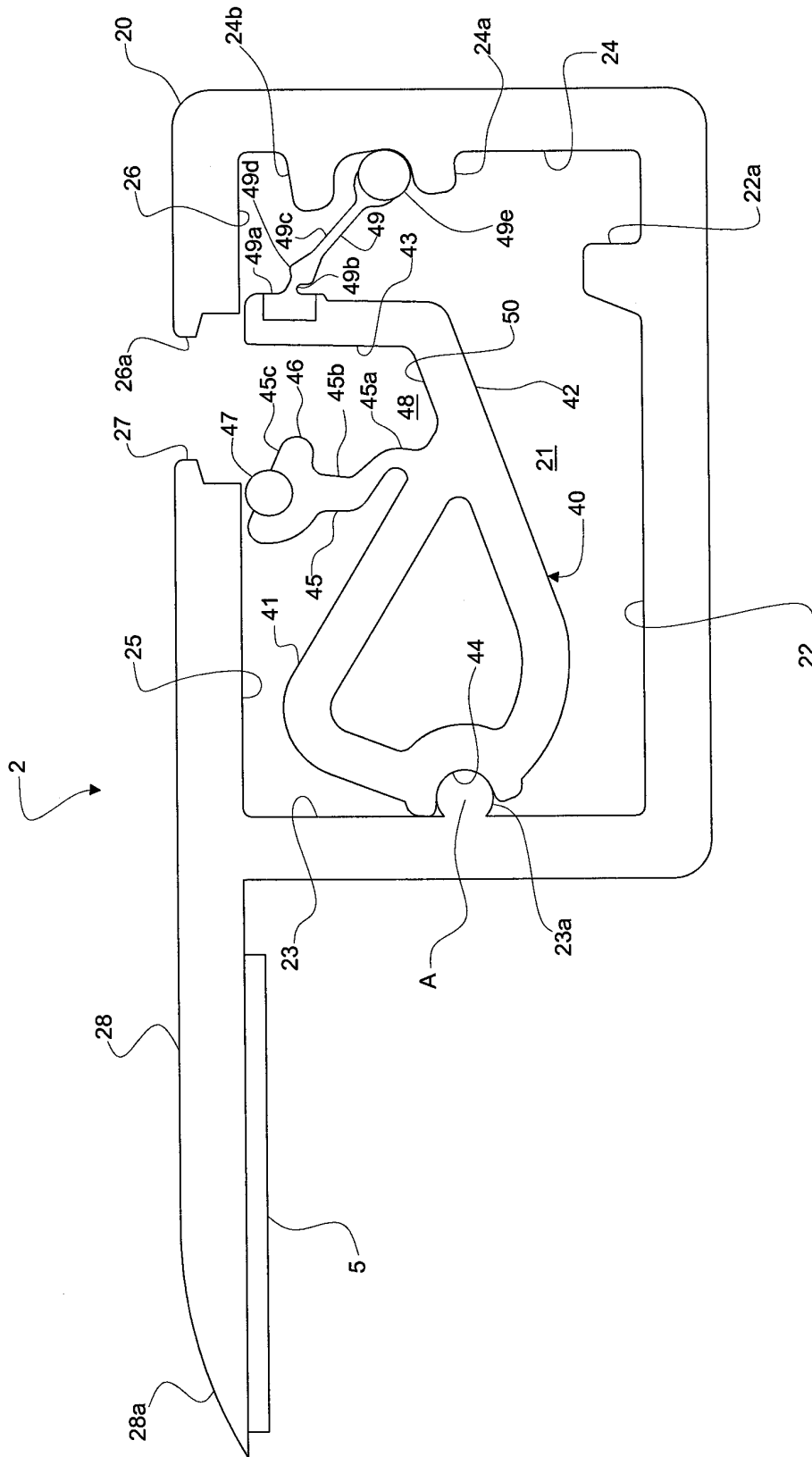


Fig. 2

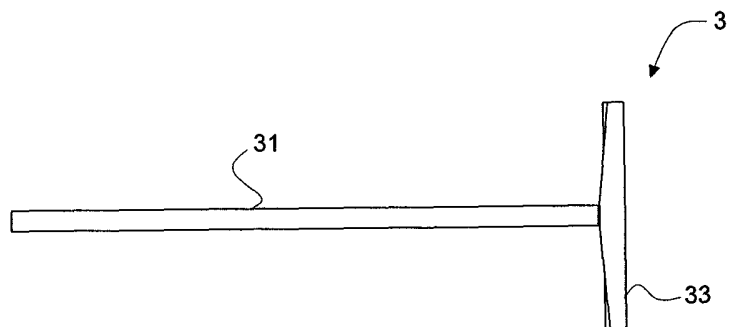


Fig. 3d

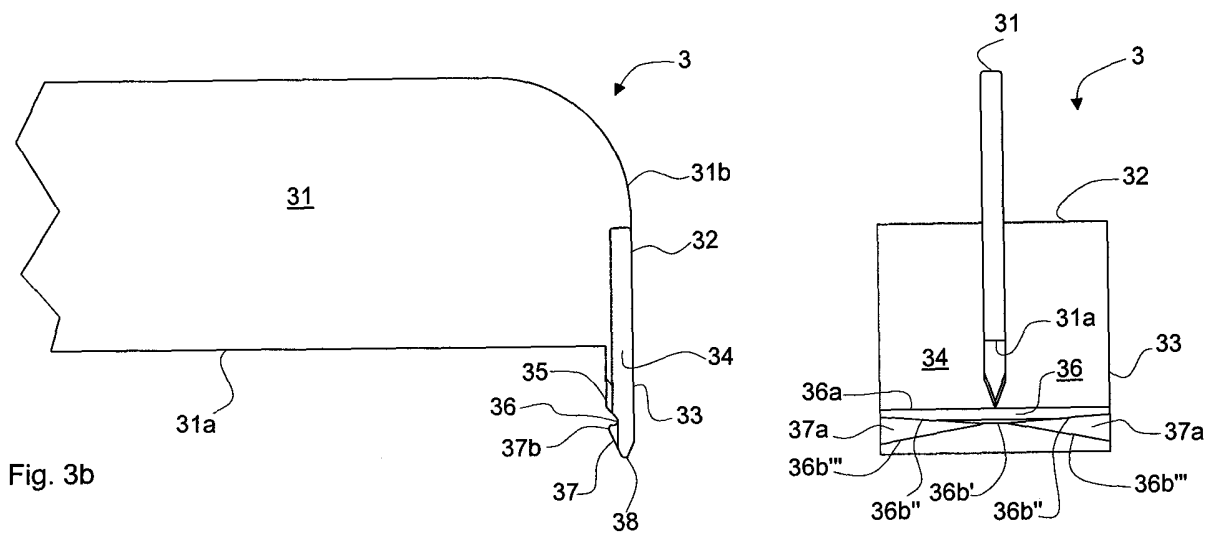


Fig. 3b

Fig. 3c

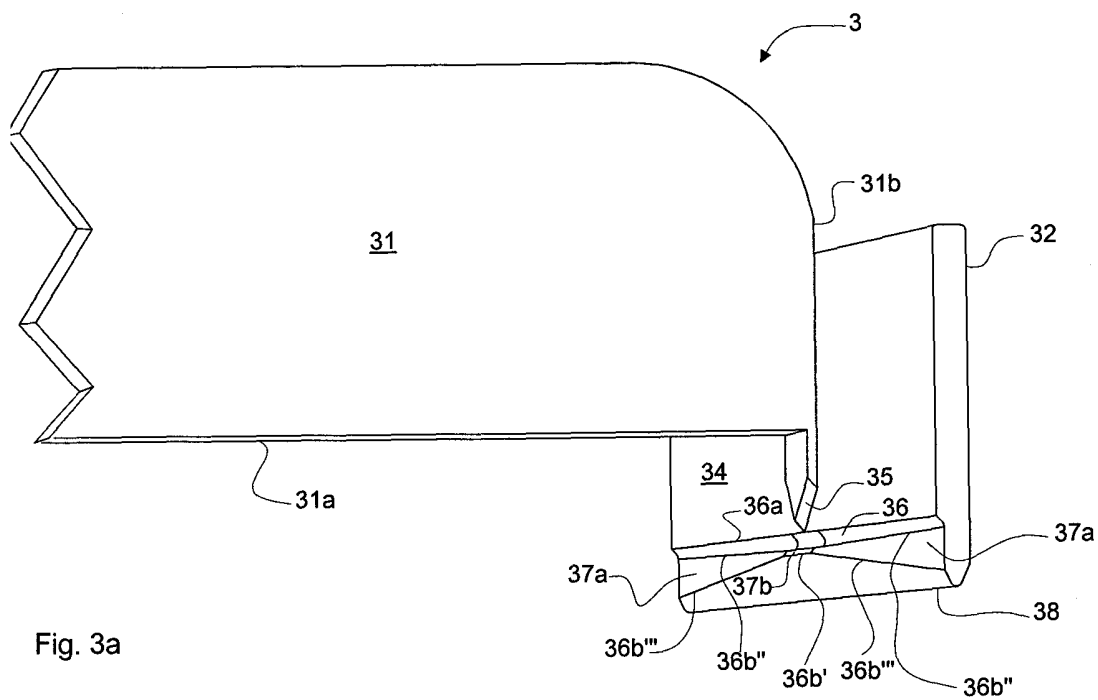


Fig. 3a

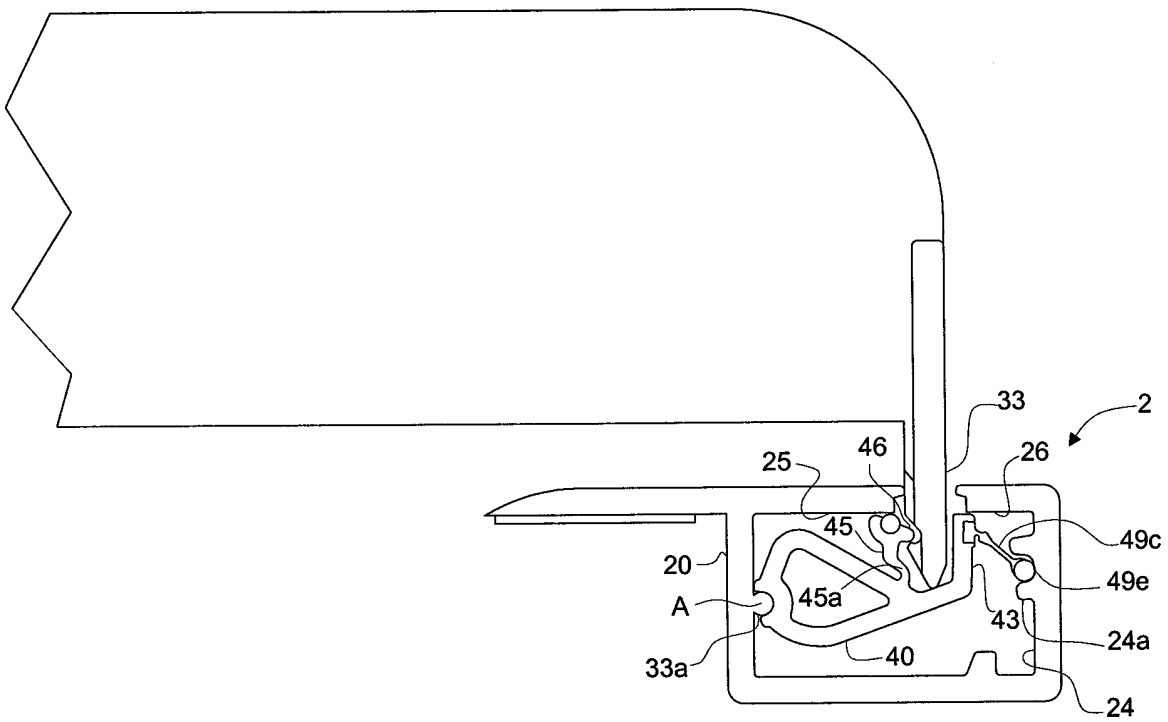


Fig. 4a

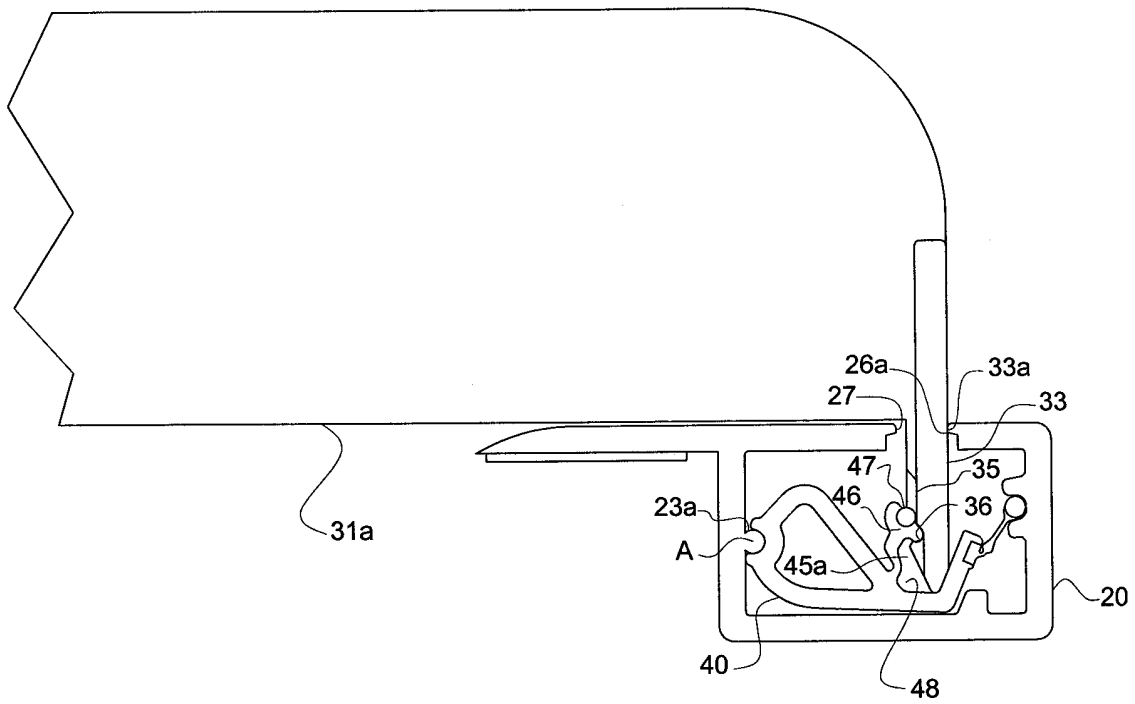
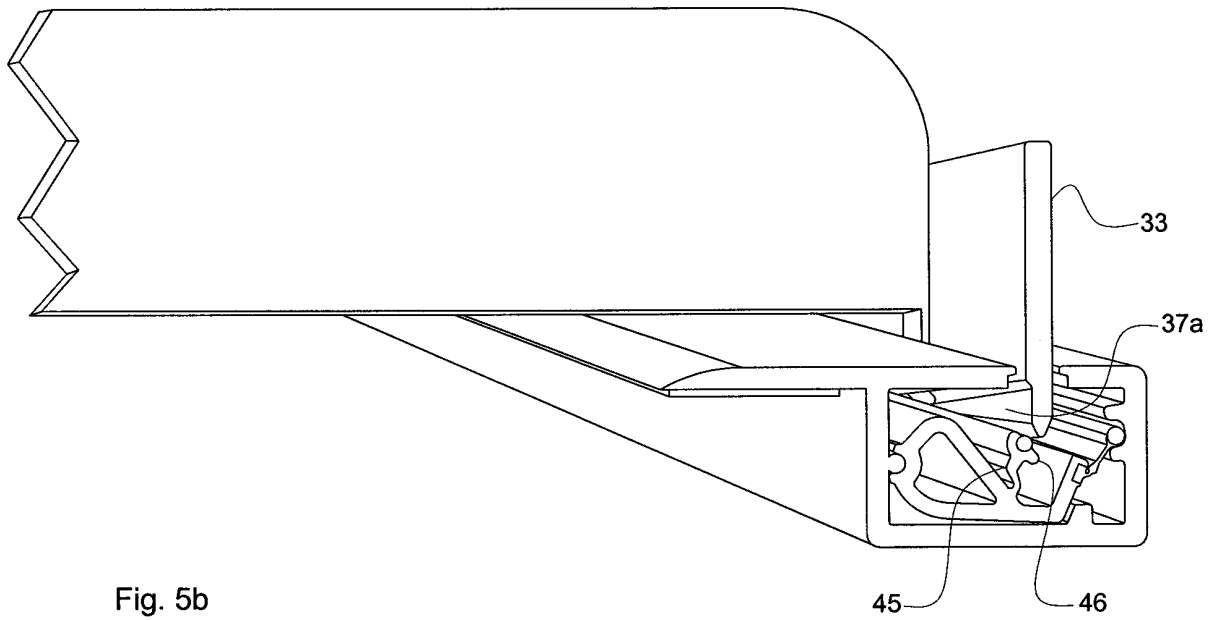
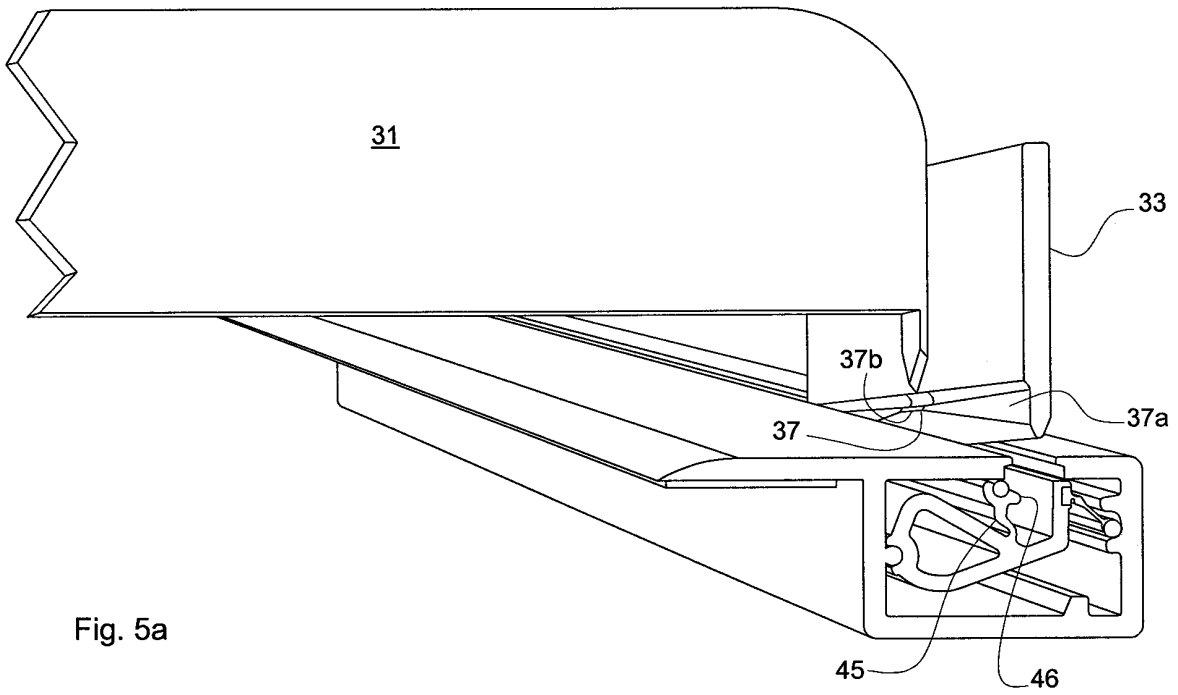


Fig. 4b



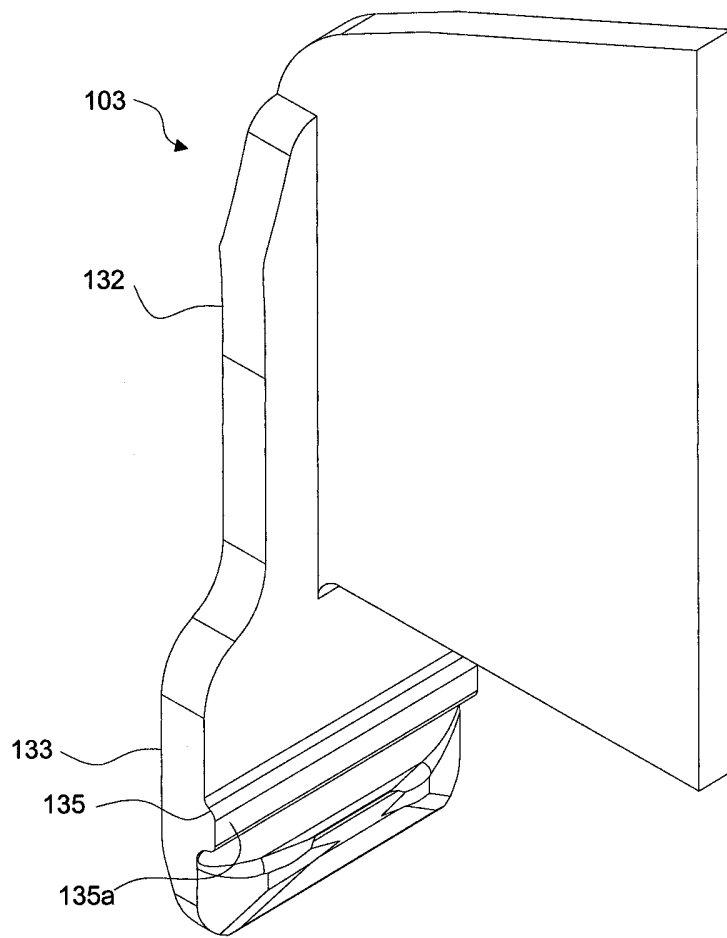


Fig. 6a

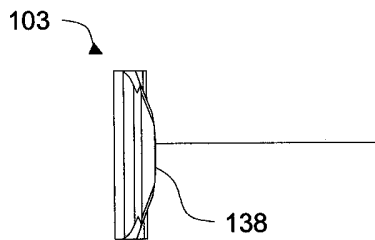


Fig. 6b

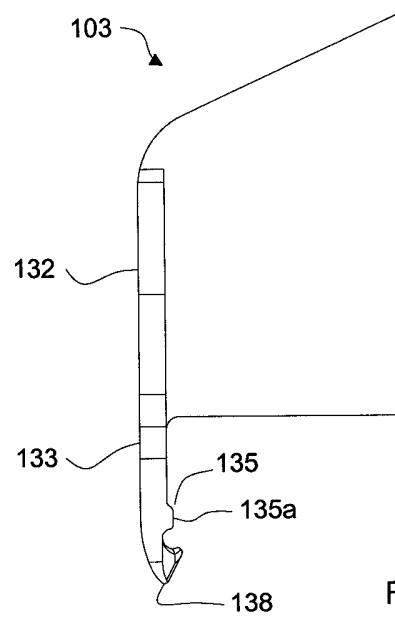


Fig. 6c

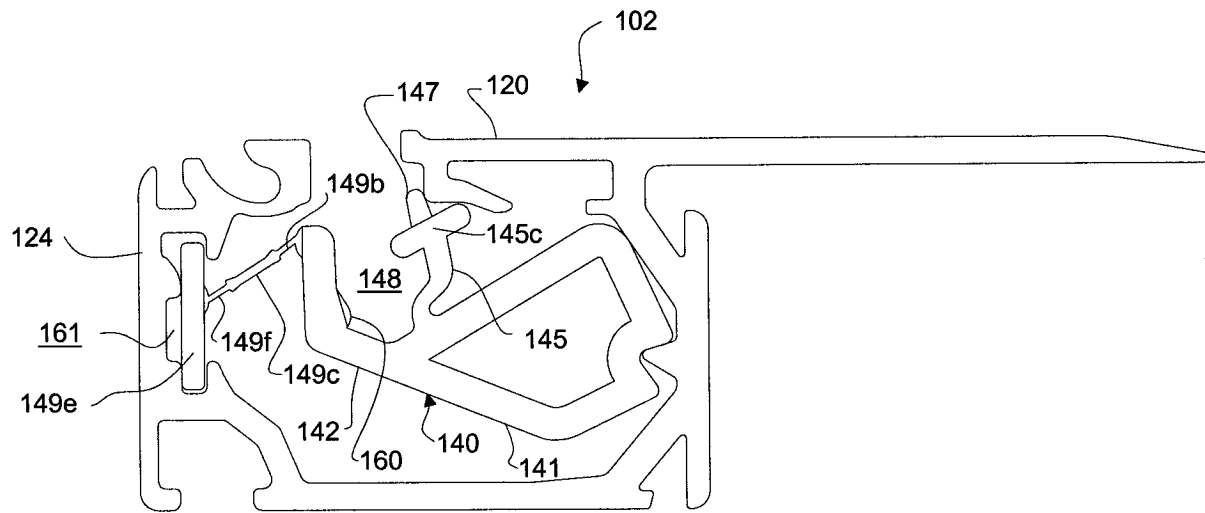


Fig. 7a

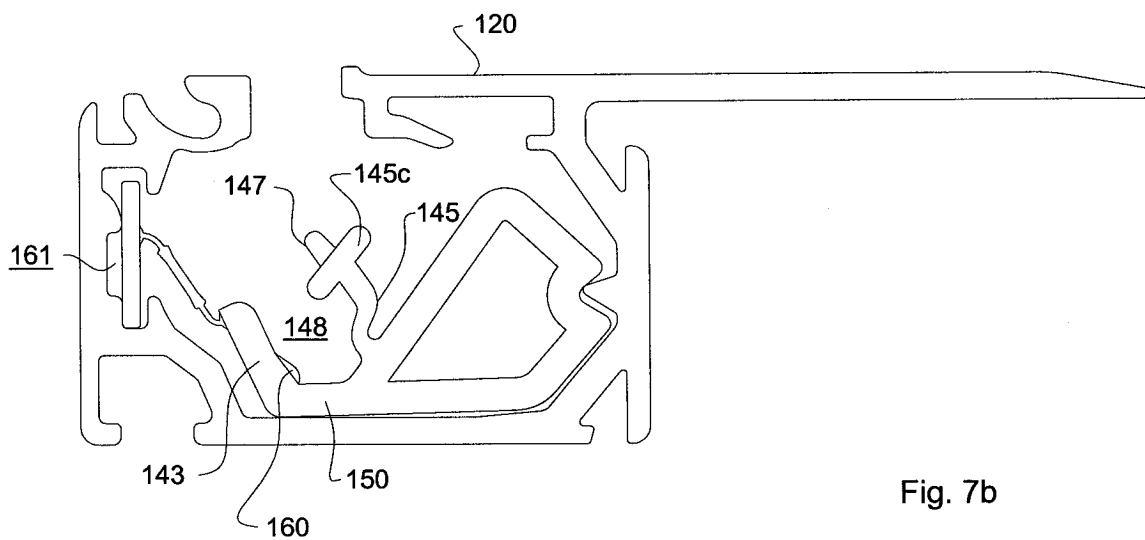
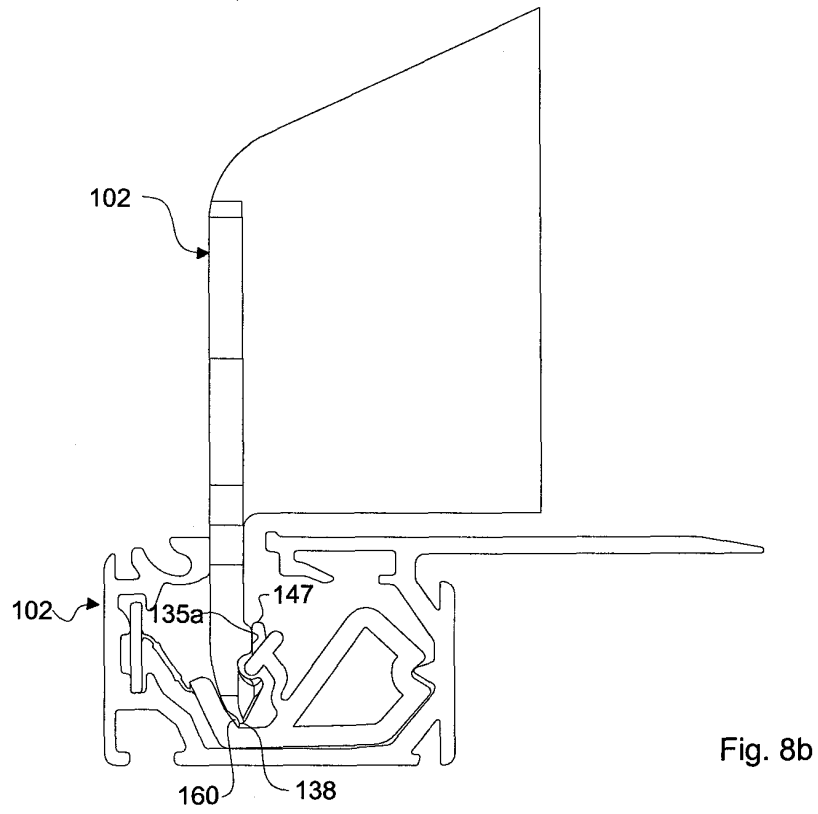
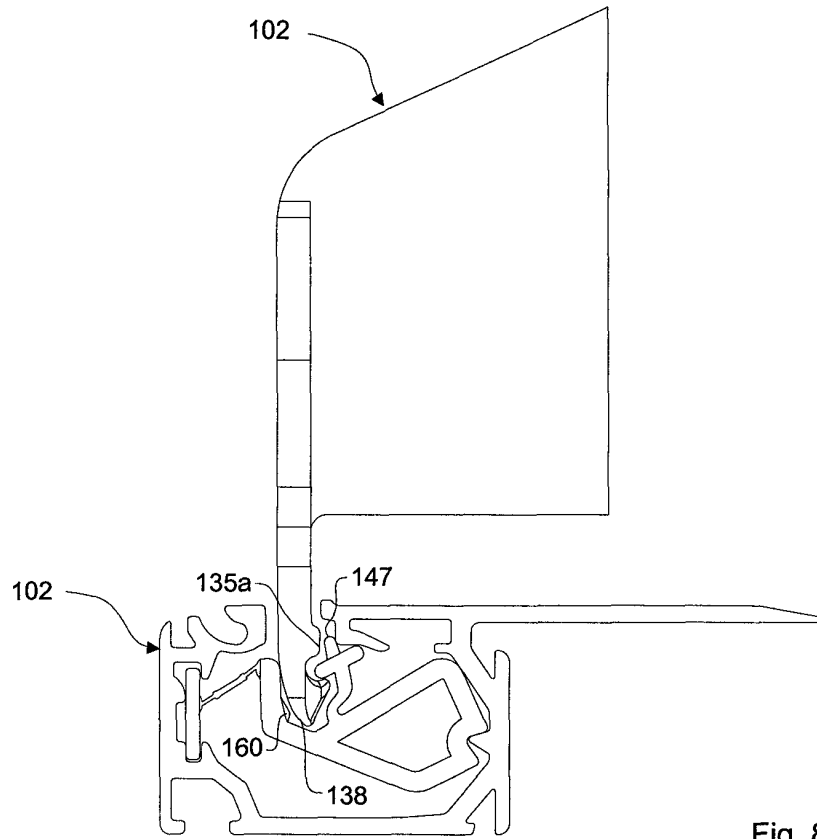


Fig. 7b





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 44 5093

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Place of search Munich		Date of completion of the search 1 November 2004	Examiner Alff, R
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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