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(54) **Modular element to protect sliding guides for sectional doors**

Modulares Element zum Schutz der Führungsschiene eines Sektionaltores

Elément modulaire pour la protection des glissières d'une porte sectionelle

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Description

FIELD OF THE INVENTION

[0001] The present invention concerns a covering and protection modular element, able to be inserted in a corresponding lateral sliding guide of sectional closing elements, such as doors, main doors, rolling shutters, blinds or suchlike. To be more exact, the modular element according to the invention is able to cooperate in use with a plurality of modular elements between two successive rolling elements of the closing element, such as for example carriers, rollers, sliders, or suchlike.

BACKGROUND OF THE INVENTION

[0002] Sectional doors or panels are known, hinged one to the other by means of hinges, wherein every panel has rolling means at the ends, such as carriers, sliders, rollers or suchlike, able to slide in appropriate guides, each one comprising a longitudinal groove, so as to pass from a closed position, which is normally substantially vertical, to an open position, which is substantially horizontal.

[0003] Each carrier is attached in correspondence with the hinging point of two adjacent panels of the door, thus leaving an empty space in the groove until the following carrier.

[0004] Extraneous bodies can therefore enter the guide, such as leaves, splinters of wood or other material, or small objects, which impede the passage of the closing element from one position to the other, open and closed.

[0005] The empty space of the guide also constitutes a potential danger for the user, inasmuch as there is a risk that he can accidentally crush his hands during the passage of the carriers.

[0006] For these reasons, each sliding guide is protected by means of a plurality of outer covering sheaths, substantially semi-tubular in shape, which are attached longitudinally on the outer side of the guide in order to make the access to the groove less easy.

[0007] The outer covering sheaths have the disadvantage, however, that their distance, in correspondence with the intermediate zone of curvature between the closed position and the open position of the closing element, has to be increased, since the carrier varies its distance from the guide itself during movement. However, the increase in distance leaves a free space, without any cover, between the sheath and the guide, and thus allows the fingers to be accidentally inserted.

[0008] Other shortcomings of the outer sheath are connected to the fact that it constitutes a spatial encumbrance at the sides of the closing element and that it requires working steps in order to apply and assemble it.

[0009] EP-A-1 180 571 discloses a security device for sliding folding doors made of a plurality of panels, wherein each panel is equipped with two modular elements secured to its ends. Each modular element is constituted by a box shaped member which is completely disposed externally and outside the guide rail wherein the wheels secured to the panels move. Moreover, each modular element has a length substantially equal to the width of each panel and transversal dimensions bigger than those of the guide rail.

[0010] Applicant has devised and embodied the present invention to overcome these shortcomings of the state of the art and to obtain other advantages.

SUMMARY OF THE INVENTION

[0011] The present invention is set forth and characterized essentially in the main claims, while the dependent claims describe other innovative characteristics of the invention.

[0012] The purpose of the invention is to achieve a modular element to cover and protect sliding guides in which the rolling means slide, such as carriers, sliders, rollers or otherwise, of sectional closing elements, which will not create any obstacle to the closing elements themselves, which is easy to assemble and which can continuously cover and protect a sliding guide for its whole extension.

[0013] In accordance with this purpose, a modular element according to the present invention is able to be inserted with a protective and filling function in a sliding guide of a sectional closing element provided at its lateral ends with rolling means able to slide in the guide, and wherein the guide comprises at least a longitudinal groove.

[0014] According to the invention, the modular element comprises at least a first portion of a female type, wherein a slot is made, and a second portion of a male type, comprising a protruding element able to be associated, due to their coupling shapes, with a corresponding slot made in an adjacent modular element.

[0015] By coupling a plurality of modular elements it is thus possible to fill inside the spaces which remain free in the groove between the rolling means.

[0016] According to a first variant, the first and the second portion have a complementary shape with respect to each other and are able to be coupled together in series, so as to form a single continuous chain with links, having a substantial continuity and uniformity.

[0017] According to another variant, in the coupling zone each modular element has a curved or rounded profile, so that it can rotate and incline with respect to the adjacent modular element in conformity with the curve of the guide, and does not impede the movement of the rolling means between the open position and the closed position of the closing element.

[0018] According to another variant, each modular element is connected in articulated manner with the adjacent modular element also by means of pivoting means, or mechanical connection members such as clips, hooks or similar.

[0019] According to another variant, two adjacent

modular elements are able to move longitudinally to each other by means of respective longitudinal displacement means.

[0020] The present invention also concerns a pair of terminal elements able to be associated in use with a chain of modular elements as mentioned above, in order to be able to connect it to the rolling means. To be more exact, a first terminal modular element is able to be associated to the end of the chain which ends with a male-type portion, while a second terminal modular element is able to be associated to the end of the chain which ends with a female-type portion.

[0021] Each terminal modular element also comprises connection means able to join in stable manner the corresponding end of the chain with the rolling means of the closing element.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] These and other characteristics of the present invention will be apparent from the following description of a preferential form of embodiment, given as a non-restrictive example, with reference to the attached drawings wherein:

- fig. 1 is a three-dimensional view of a sectional door;
- fig. 2 is a view of a plurality of modular elements according to the present invention inserted into a sliding guide of the sectional door in fig. 1;
- fig. 3 is another view of the modular elements in fig. 2;
- fig. 4 is a longitudinal section of a detail of fig. 2;
- fig. 5 is a three-dimensional view of a modular element according to the present invention;
- fig. 6 shows a plane view of the modular element in fig. 5, coupled with another modular element;
- fig. 7 is a sectioned view of the element in fig. 6 inserted in a sliding guide;
- fig. 8 is a three-dimensional view of a first terminal modular element;
- fig. 9 is a plane view of the element in fig. 8;
- fig. 10 is a three-dimensional view of a second terminal modular element;
- fig. 11 is a plane view of fig. 10;
- fig. 12 is a longitudinal section along the line XII-XII of fig. 4;
- fig. 13 shows a variant of fig. 5.

DESCRIPTION OF A PREFERENTIAL FORM OF EMBODIMENT OF THE INVENTION

[0023] With reference to figs. 1 and 2, they show a sectional door 20 consisting of a plurality of sections 21 or panels, hinged one to the other along a longitudinal edge. Each panel 21 is provided at the lateral ends with a corresponding carrier 23, comprising two rollers 25a, of which only one is visible in the drawings, mounted rotatable by means of a pin 55 to the carrier 23. The rollers 25a are also able to slide in a longitudinal groove 26, made in a corresponding lateral guide 27.

[0024] According to the invention, a plurality of modular elements 30 are able to slide in the groove 26 (figs. 2 to 7) and fill the empty space of the groove 26 between two adjacent carriers 23, preventing any object from entering therein. To be more exact, on one side the guide 27 comprises a fold 29 (figs. 4 and 12), able to close the modular elements 30 inside the groove 26, preventing them from coming out.

[0025] Each modular element 30 is preferably made of material with a low friction coefficient, such as for example Teflon, polyzene, nylon or suchlike.

[0026] Each modular element 30 is of the full type, porous, or hollow inside.

[0027] Each modular element comprises a first female-type portion 32 and a second male-type portion 36, complementary to each other and able to be perfectly integrated one with the other. The first portion 32 comprises an upper wall 33 and a lower wall 35, parallel to each other and having a rounded outer edge 37. The two walls 33 and 35 define a slot 34 functioning as a housing to accommodate the second portion 36.

[0028] In this case, the second portion 36 comprises a protruding element such as a plane disk 38 able to be completely inserted with continuity of shape into the slot 34 of an adjacent modular element 30, so as to form a single continuous chain between one carrier 23 and the next.

[0029] In the intermediate zone between the first portion 32 and the second portion 36 there is also a step 39 that partly surrounds the inner perimeter of the plane disk 38 and against which the outer edge 37 of the first portion 32 is able to abut.

[0030] According to a variant shown in fig. 13, a modular element 130 comprises a first female-type portion 132 where, between two lateral arms 133 and 135, there is an aperture 134 wherein a protruding element 138 of an adjacent modular element 130 is able to be assembled, through juxtaposition, as in a puzzle.

[0031] It is clear however that other known couplings of a male/female type can be provided, without departing from the field and scope of the present invention.

[0032] In the embodiment shown in figs. 5-7, the modular element 30 is also provided with pivoting means 41 able to connect it in articulated manner with an adjacent modular element 30.

[0033] To be more exact, each modular element 30 is rotatably pivoted to an adjacent modular element and can rotate and incline (fig. 3) with respect thereto, so as to adapt to the movement of the carriers 23 in the guide 27, also in the curved segment between a vertical segment 27a and a horizontal segment 27b.

[0034] In this case, a peg 42 is attached substantially to the center of the plane disk 38 and is able to be inserted with play in a seating 45, or eyelet, made inside the first portion 32.

[0035] The seating 45 has a longitudinally elongated shape so as to allow the peg 42 to move inside it.

[0036] To guide the insertion of the peg 42 to the seating 45, a groove 46, open towards the outside, is made on the inner side respectively of the upper wall 33 and the lower wall 35.

[0037] The movement of the peg 42 in the corresponding seating 45 allows one modular element 30 to be moved longitudinally nearer to or farther from the other modular element 30.

[0038] To be more exact, since in the curved segment of the guide 27 two adjacent carriers 23 tend to draw closer to each other during movement, the modular elements 30 which are between one carrier 23 and the other can come closer to each other. On the contrary, when two adjacent carriers 23 are in the vertical zone, they tend to move away from each other and therefore the modular elements 30 can also move away from each other.

[0039] The reciprocal movement of two adjacent modular elements 30 advantageously compensates a variation in the reciprocal distance of two carriers 23, also in the event that the door 20 is provided with sections 21 of an unconventional height that is little different from a standard height.

[0040] According to another characteristic of the present invention, in order to ensure a stable movement of the modular elements 30 during the opening and closing of the door 20, the ends of the chain of modular elements 30 are connected in stable manner to the corresponding carriers 23 too, by means of respectively a first terminal modular element 52 and a second terminal modular element 50.

[0041] To be more exact, the first terminal modular element 52 shown in figs. 4, 10 and 11 is able to connect the pin 55 of the first roller 25a with the final part of the chain of modular elements 30 ending with a plane disk 38.

[0042] To be more exact, the first terminal modular element 52 comprises on one side a slot 34 and on the other side a supporting element 53 ending with an open ring 54 able to accommodate the cylindrical pin 55 of the roller 25a, outside the groove 26 (figs. 4 and 12).

[0043] A protection element 56, shaped like a horse-shoe, is also fixed above the supporting element 53, arranged in use directly below the carrier 23, so as to close and completely cover the roller 25a from the outside and further reduce the risk of splinters, dust or otherwise entering the groove 26.

[0044] On the contrary, the second terminal modular element 50 (figs. 8 and 9) is able to connect the pin 55 of the second roller 25a with the final part of the chain, which ends with a slot 34.

[0045] To be more exact, the second terminal modular element 50 comprises on one side a plane disk 38 and on the other side, like the first terminal modular element 52, the supporting element 53 with the relative open ring 54.

[0046] It is clear, however, that modifications and/or additions of parts can be made to the modular filling element 30 as described heretofore, without departing from the field and scope of the present invention.

[0047] For example, in the event that each carrier 23 is provided with a single roller 25a, the first and second terminal element 52, 50 can be attached on the same pin 55 as the roller 25a on diametrically opposite sides. In this embodiment, the open ring 54 and the protection element 56 of a first terminal modular element 52 are arranged in such a manner that, in use, they are positioned for example above or below the open ring 54 and the protection element 56 of the second terminal modular element 50.

[0048] It is also clear that, although the present invention has been described with reference to specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of modular element to protect sliding guides of sectional closing elements, all of which shall come within the field and scope of the present invention

Claims

1. Modular element to protect a sliding guide (27) of a sectional closing element (20) such as a door, a main door, a rolling shutter, a blind or suchlike, wherein said closing element (20) comprises a plurality of sections or panels (21) hinged longitudinally to each other, wherein said guide (27) comprises a groove (26) and wherein one or more sections (21) are provided at their lateral ends with rolling means (25a) which slide in said groove (26) of said guide (27), **characterized in that** said modular element, in use, is completely inserted inside said groove (26) between the rolling means (25a) of two adjacent sections (21), **in that** said modular element comprises at least a first female-type portion (32) having a slot (34) and a second male-type portion (36) comprising a protruding element (38) complementary to said slot (34), and **in that** said protruding element (38), in use, is coupled with a corresponding slot (34) made in an adjacent modular element (30), in such a manner that a plurality of said modular elements (30) coupled one to the other form a chain which fills the spaces which remain free inside said groove (26) between said rolling means (25a) of two adjacent sections (21).

2. Modular element as in claim 1, **characterized in that** said protruding element (38) has a rounded profile which, in use, allows the rotation or inclination thereof with respect to the slot (34) of an adjacent modular element (30), so that said chain follows the curve of said guide (27) between a horizontal segment (27b) and a vertical segment (27a).

3. Modular element as in claim 1 or 2, **characterized in that** said second male-type portion (36) and said first female-type portion (32) comprises coupling

means (42, 45) which, in use, are coupled with corresponding coupling means (42, 45) of an adjacent module (30) to allow the reciprocal movement of two adjacent modular elements (30).

4. Modular element as in claim 1, **characterized in that** said protruding element (38) is provided with pin means (42) able to be inserted with play into a corresponding seating (45) made in said first portion (32) of an adjacent modular element (30), the coupling of said pin means (42) and said seating (45) being able to allow a relative movement of two adjacent modular elements (30) during the displacement of said closing element (20).

5. Modular element as in any claim hereinbefore, **characterized in that** said first female-type portion (32) comprises two walls (33, 35) parallel to each other and able to define inside them a slot (34), functioning as a housing.

6. Modular element as in any claim from 1 to 4 inclusive, **characterized in that** said first female-type portion (32) comprises two lateral arms (133, 135) able to define inside them an aperture (134) open towards the outside, functioning as a housing.

7. Modular element as in any claim from 1 to 5 inclusive, **characterized in that** said protruding element comprises a disk (38) able to be completely inserted in said slot (34).

8. Terminal modular element (50) able to be arranged between a first end of a chain of modular elements (30), according to any one of the previous claims, and said rolling means (25a), wherein said first end ends with a protruding element (38), **characterized in that** it comprises on one side a first portion wherein a slot (34) is made, able to be associated with said protruding element (38), and on the other side connection means (54) able to join said chain to said rolling means (25a).

9. Terminal modular element (50) able to be arranged between a second end of a chain of modular elements (30), according to any one of the previous claims from 1 to 7 inclusive, and said rolling means (25a), wherein said second end ends with a slot (34), **characterized in that** it comprises on one side a first portion provided with a protruding element (38), able to be associated with said slot (34), and on the other side connection means (54) able to join said chain of modular elements (30) to said rolling means (25a).

10. Terminal modular (50) element as in claim 8 or 9, **characterized in that** said connection means comprise an attachment element (54), having the form of an open ring, to be fixed in stable manner to a pin (55) of said rolling means (25a).

11. Terminal modular (50) element as in claim 10, **characterized in that** above said attachment means (54) a protection element (56) is fixed, shaped substantially like a horse-shoe and able to accommodate said pin (55) inside.

Patentansprüche

1. Modulares Element zum Schutz einer Gleitführung (27) eines mit Abschnitten ausgebildeten Schließelementes (20) wie einer Tür, einer Eingangstür, einem Rollladen, einer Verdunkelung oder dergleichen, wobei das Schließelement (20) eine Anzahl von in Längsrichtung gelenkig miteinander verbundenen Abschnitten oder Paneelen aufweist, wobei die Führung (27) eine Nut (26) umfasst und wobei ein Abschnitt oder mehrere Abschnitte (21) an ihren längsseitigen Enden mit Rollmitteln (25a) ausgestattet sind, die in der Nut (26) der Führung (27) gleiten, **dadurch gekennzeichnet, dass** das modulare Element im Einsatz vollständig innerhalb der Nut (26) zwischen den Rollmitteln (25a) zweier benachbarter Abschnitte (21) angeordnet ist, dass das modulare Element wenigstens einen ersten Abschnitt (32) eines weiblichen Typs mit einem Schlitz (34) und einen zweiten Abschnitt (36) eines männlichen Typs mit einem komplementär zu dem Schlitz (34) ausgebildeten vorstehenden Element (38) aufweist und dass das vorstehende Element (38) im Einsatz mit einem in einem benachbarten modularen Element (30) ausgebildeten zugeordneten Schlitz (34) derart gekoppelt ist, dass eine Anzahl von miteinander gekoppelten modularen Elementen (30) eine Kette ausbilden, die die Zwischenräume ausfüllt, die innerhalb der Nut (26) zwischen den Rollmitteln (25a) zweier benachbarter Abschnitte (21) frei bleiben.

2. Modulares Element nach Anspruch 1, **dadurch gekennzeichnet, dass** das vorstehende Element (38) ein abgerundetes Profil aufweist, das im Einsatz die Drehung oder Neigung desselben in Bezug auf den Schlitz (34) eines benachbarten modularen Elementes (30) gestattet, so dass die Kette der Krümmung der Führung (27) zwischen einem horizontalen Segment (27b) und einem vertikalen Segment (27a) folgt.

3. Modulares Element nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der zweite Abschnitt (36) des männlichen Typs und der erste Abschnitt (32) des weiblichen Typs Kopplungsmittel (42, 45) umfassen, die im Einsatz mit zugeordneten Kvppelmitteln (42, 45) eines benachbarten Moduls (30) ge-

koppelt sind, um die wechselseitige Bewegung der beiden benachbarten modularen Elemente (30) zu gestatten.

4. Modulares Element nach Anspruch 1, **dadurch gekennzeichnet, dass** das vorstehende Element (38) mit Stiftmitteln (42) ausgebildet ist, die dazu eingerichtet sind, mit Spiel in einen zugehörigen Sitz (45) eingefügt zu werden, der in dem ersten Abschnitt (32) eines benachbarten modularen Elementes (30) ausgebildet ist, wobei die Kopplung der Stiftmittel (42) und des Sitzes (45) dazu eingerichtet ist, eine relative Bewegung von zwei benachbarten modularen Elementen (30) während des Verschiebens des Schließelementes (20) zu gestatten.

5. Modulares Element nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der erste Abschnitt (32) des weiblichen Typs zwei Wände (33, 35) aufweist, die parallel zueinander ausgerichtet und dazu eingerichtet sind, zwischen ihnen einen Schlitz (34) auszubilden, der als ein Gehäuse wirkt.

6. Modulares Element nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** der erste Abschnitt (32) des weiblichen Typs zwei seitliche Arme (133, 135) aufweist, die dazu eingerichtet sind, zwischen ihnen eine nach außen geöffnete und als ein Gehäuse dienende Öffnung (134) auszubilden.

7. Modulares Element nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** das vorstehende Element eine Scheibe (38) umfasst, die dazu eingerichtet ist, vollständig in den Schlitz (34) eingefügt zu werden.

8. Modulares Abschlusselement (50), das dazu eingerichtet ist, zwischen einem ersten Ende einer Kette von modularen Elementen (30) gemäß einem der vorangehenden Ansprüche und den Rollmitteln (25a) eingefügt zu werden, wobei das erste Ende mit einem vorstehenden Element (38) abschließt, **dadurch gekennzeichnet, dass** es an einer Seite einen ersten Abschnitt aufweist, in den ein Schlitz (34) eingebracht ist, der dazu eingerichtet ist, mit dem vorstehenden Element (38) gekoppelt zu werden, und an der anderen Seite über Verbindungsmittel (54) verfügt, die dazu eingerichtet sind, mit der Kette der Rollmittel (25a) verbunden zu werden.

9. Modulares Abschlusselement (50), das dazu eingerichte ist, zwischen einem zweiten Ende einer Kette von modularen Elementen (30) gemäß einem der vorangehenden Ansprüche 1 bis 7 und den Rollmitteln (25a) angeordnet zu werden, wobei das zweite Ende mit einem Schlitz (34) endet, **dadurch gekennzeichnet, dass** es an einer Seite eine mit einem vorstehenden Element (38) ausgebildete ersten Abschnitt aufweist, das dazu eingerichtet ist, mit dem Schlitz (34) gekoppelt zu werden, und an der anderen Seite über Verbindungsmittel (54) verfügt, die dazu eingerichtet sind, die Kette von modularen Elementen (30) mit den Rollmitteln (25a) zu verbinden.

10. Modulares Abschlusselement (50) nach Anspruch 8 oder 9, **dadurch gekennzeichnet, dass** das Verbindungsmittel ein Befestigungsmittel (54) aufweist, das in der Gestalt eines offenen Ringes ausgebildet ist, um in stabiler Art und Weise mit einem Stift (55) der Rollmittel (25a) verbunden zu werden.

11. Modulares Abschlusselement (50) nach Anspruch 10, **dadurch gekennzeichnet, dass** oberhalb der Befestigungsmittel (54) ein vorstehendes Element (56) angebracht ist, das im Wesentlichen wie ein Hufeisen gestaltet und dazu eingerichtet ist, innenseitig den Stift (55) aufzunehmen.

Revendications

1. Élément modulaire pour la protection d'une glissière (27) d'un élément de fermeture sectionnel (20) tel qu'une porte, une porte principale, un volet roulant un store ou analogue, dans lequel ledit élément de fermeture (20) comprend une pluralité de sections ou panneaux (21) articulés entre eux dans le sens de la longueur, dans lequel ladite glissière (27) comprend une gorge (26) et dans lequel une section ou davantage (21) sont munies, à leurs extrémités latérales, de moyens roulants (25a) qui coulissent dans ladite gorge (26) de ladite glissière (27), **caractérisé en ce que** ledit élément modulaire, à l'utilisation, est complètement inséré à l'intérieur de ladite gorge (26) entre les moyens roulants (25a) de deux sections adjacentes (21), **en ce que** ledit élément modulaire comprend au moins une première partie de type femelle (32) présentant une encoche (34), et une seconde partie de type mâle (36) comprenant un élément en saillie (38) complémentaire de ladite encoche (34), et **en ce que** ledit élément en saillie (38), à l'utilisation, est couplé à une encoche correspondante (34) ménagée dans un élément modulaire adjacent (30), de telle sorte qu'une pluralité desdits éléments modulaires (30) couplés les uns aux autres forme une chaîne qui remplit les espaces restés libres à l'intérieur de ladite gorge (26) entre lesdits moyens roulants (25a) de deux sections adjacentes (21).

2. Élément modulaire selon la revendication 1, **caractérisé en ce que** ledit élément en saillie (38) présente un profil arrondi qui, à l'utilisation, permet la rotation ou l'inclinaison de cet élément par rapport à

l'encoche (34) d'un élément modulaire adjacent (30), de sorte que ladite chaîne suive la courbure de ladite glissière (27) entre un segment horizontal (27b) et un segment vertical (21a).

3. Élément modulaire selon la revendication 1 ou 2, **caractérisé en ce que** ladite seconde partie de type mâle (36) et ladite première partie de type femelle (32) comprennent des moyens d'accouplement (42, 45) qui, à l'utilisation, sont couplés à des moyens d'accouplement correspondants (42, 45) d'un module adjacent (30) pour permettre le mouvement de va-et-vient de deux éléments modulaires adjacents (30).

4. Élément modulaire selon la revendication 1, **caractérisé en ce que** ledit élément en saillie (38) est pourvu d'un axe (42) pouvant être introduit avec du jeu dans un siège correspondant (45) ménagé dans ladite première partie (32) d'un élément modulaire adjacent (30), l'accouplement dudit axe (42) et dudit siège (45) pouvant permettre le mouvement relatif de deux éléments modulaires adjacents (30) lors du déplacement dudit élément de fermeture (20).

5. Élément modulaire selon l'une quelconque des revendications ci-dessus, **caractérisé en ce que** ladite première parte de type femelle (32) comprend deux parois (33, 35) parallèles entre elles et aptes à définir entre elles une encoche (34), fonctionnant comme un réceptacle.

6. Élément modulaire selon l'une quelconque des revendications 1 à 7, 4 incluse, **caractérisé en ce que** ladite première parte de type femelle (32) comprend deux bras latéraux (133, 135) aptes à définir entre eux une ouverture (134) vers l'extérieur, fonctionnant comme un réceptacle.

7. Élément modulaire selon l'une quelconque des revendications 1 à 5 incluse, **caractérisé en ce que** ledit élément en saillie comprend un disque (38) pouvant être complètement inséré dans ladite encoche (34).

8. Élément modulaire terminal (50) pouvant être installé entre une première extrémité d'une chaîne d'éléments modulaires (30), selon l'une quelconque des revendications précédentes, et lesdits moyens roulants (25a), dans lequel ladite première extrémité se termine par un élément en saillie (38), **caractérisé en ce qu'**il comprend d'un côté une première partie dans laquelle est ménagée une encoche (34) pouvant être associée audit élément en saillie (38) et, de l'autre côté, des moyens de liaison (54) aptes à assembler ladite chaîne auxdits moyens roulants (25a).

9. Élément modulaire terminal (50) pouvant être installé entre une seconde extrémité d'une chaîne d'éléments modulaires (30), selon l'une quelconque des revendications précédentes 1 à 7 incluse, et lesdits moyens roulants (25a), dans lequel ladite seconde extrémité se termine par une encoche (34), **caractérisé en ce qu'**il comprend, d'un côté, une première partie pourvue d'un élément en saillie (38) pouvant être associé à ladite encoche (34) et, de l'autre côté, des moyens de liaison (54) aptes à assembler ladite chaîne d'éléments modulaires (30) auxdits moyens roulants (25a).

10. Élément modulaire terminal (50) selon la revendication 8 ou 9, **caractérisé en ce que** lesdits moyens de liaison comprennent un élément d'attache (54), présentant la forme d'un anneau ouvert, destiné à être fixé de façon stable à un axe (55) desdits moyens roulants (25a).

11. Élément modulaire terminal (50) selon la revendication 10, **caractérisé en ce qu'**il est fixé au-dessus desdits moyens d'attache (54) un élément de protection (56), présentant sensiblement la forme d'un sabot et pouvant recevoir ledit axe (55).

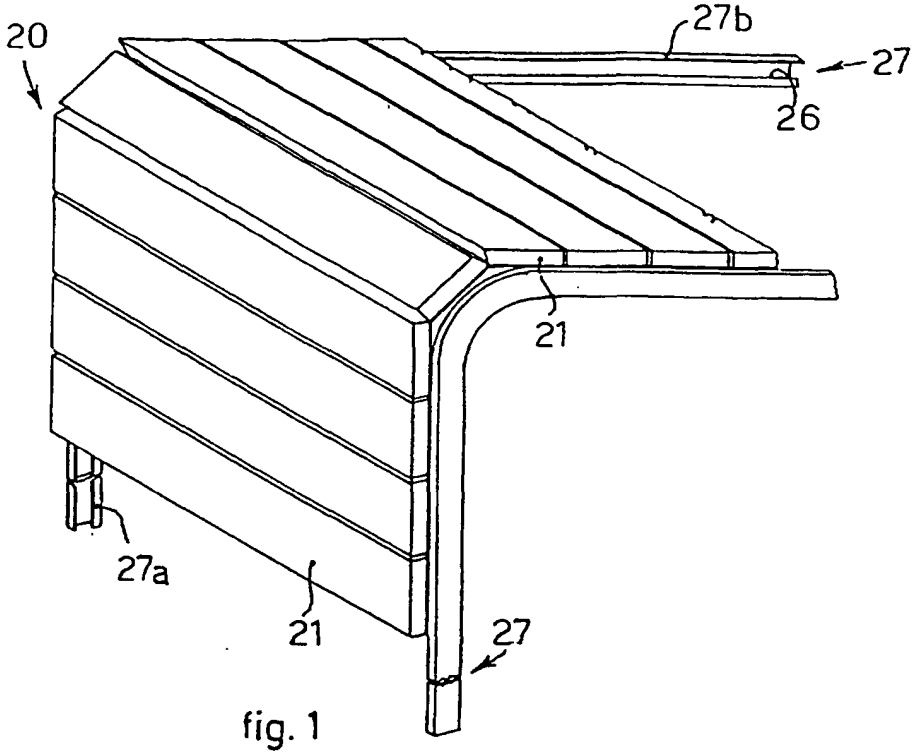


fig. 1

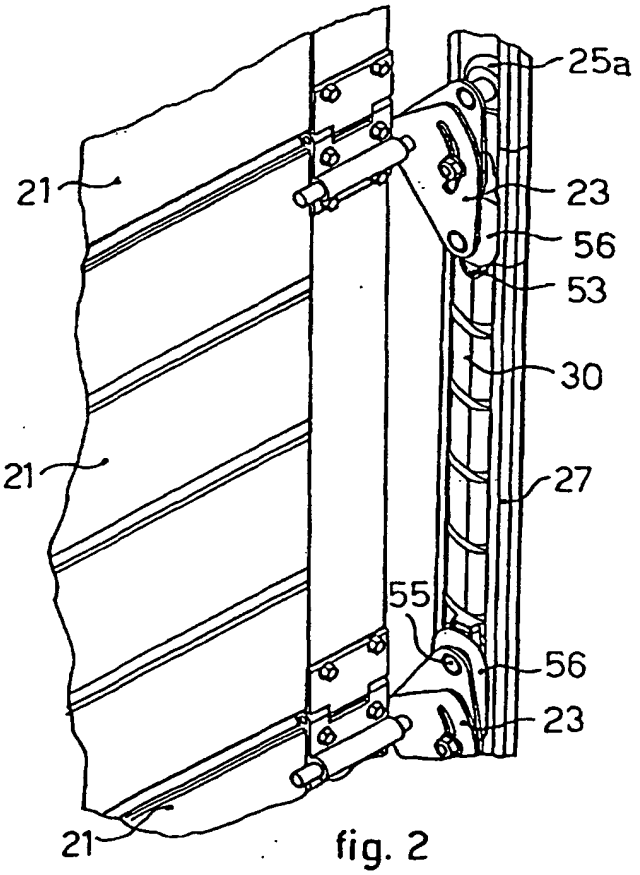


fig. 2

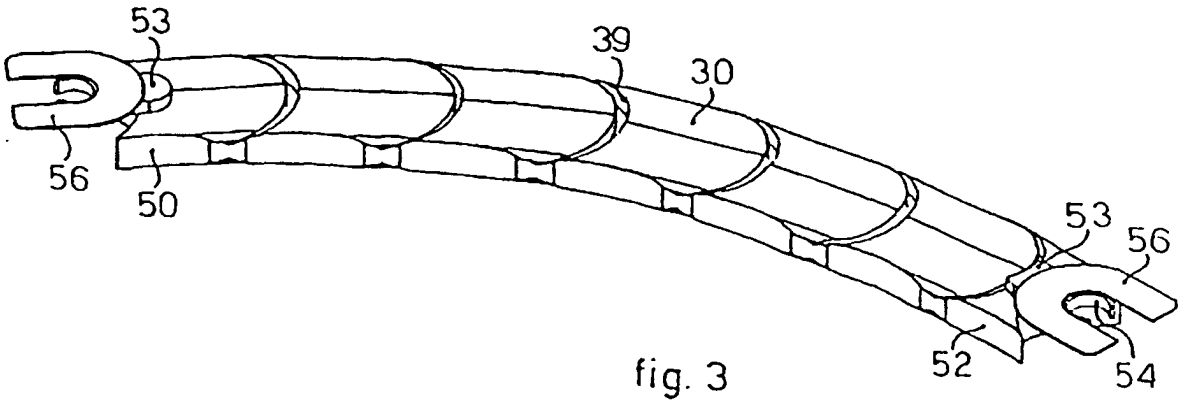


fig. 3

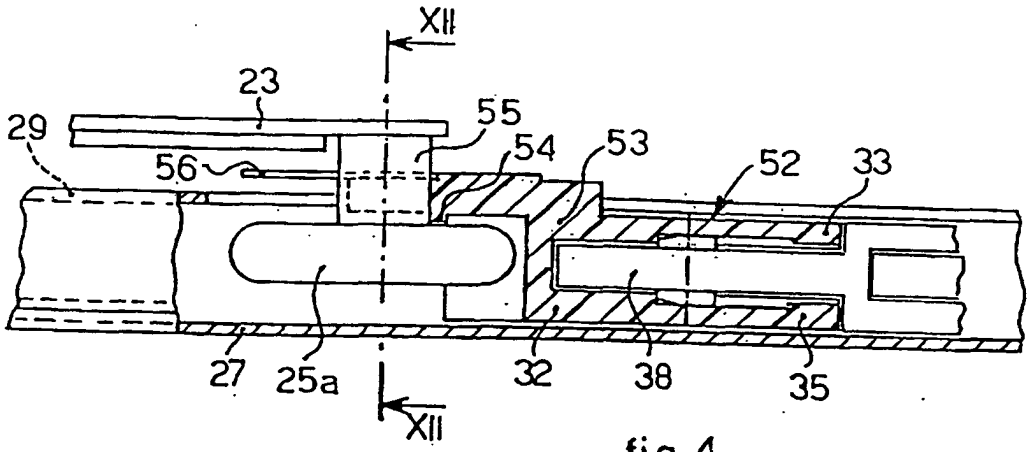


fig. 4

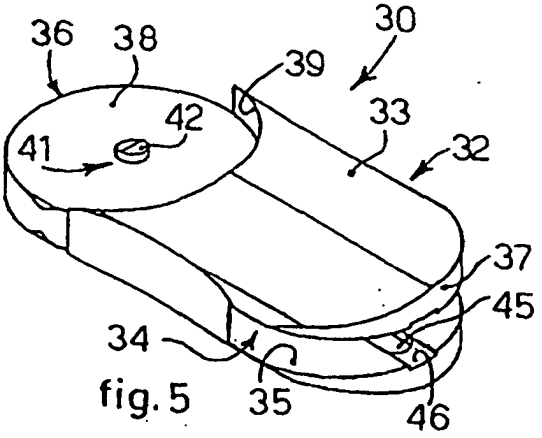


fig. 5

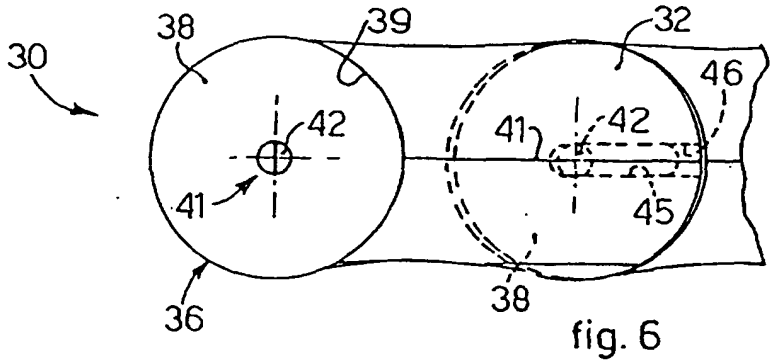


fig. 6

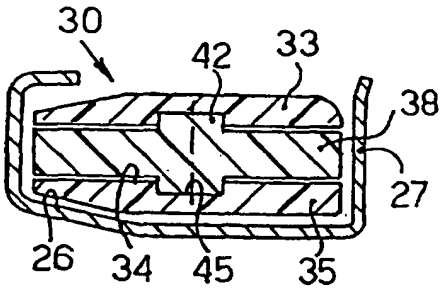


fig. 7

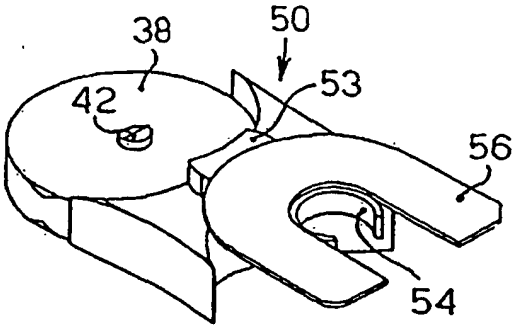


fig. 8

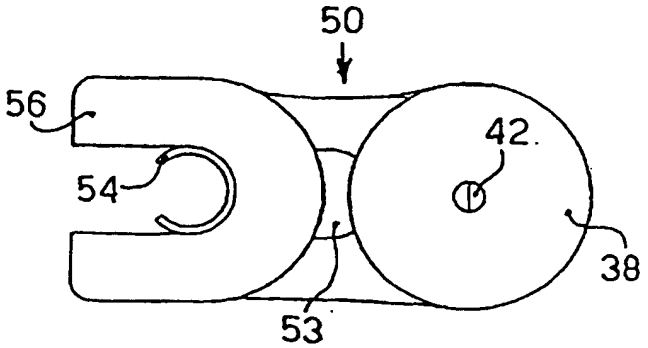


fig. 9

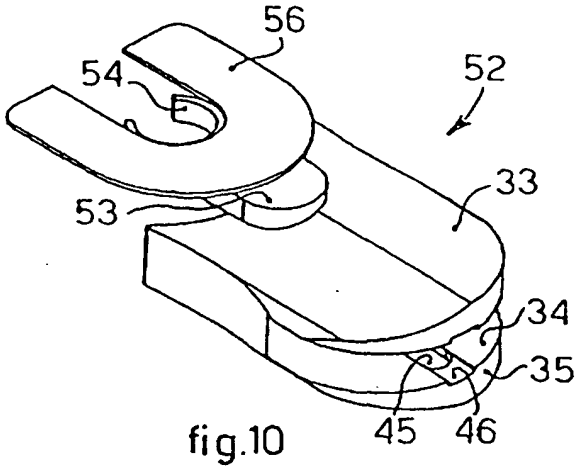


fig.10

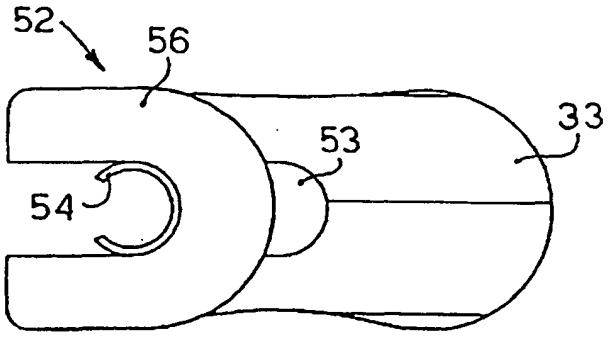


fig.11

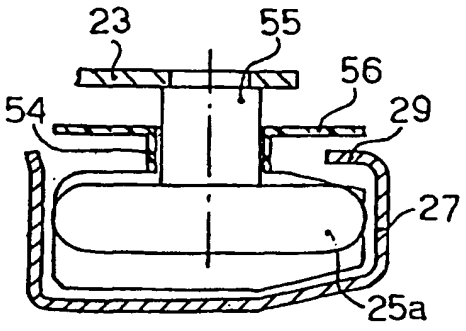


fig.12

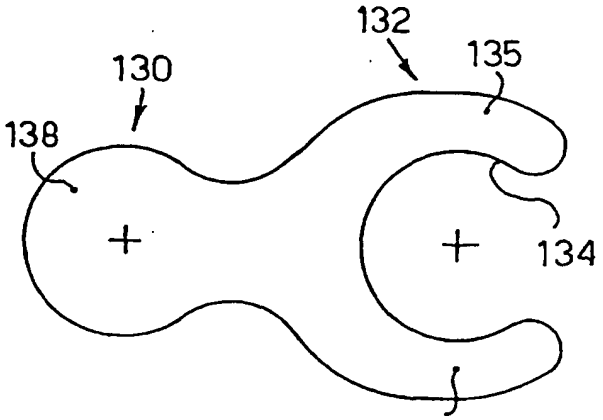


fig.13