

(19)



(11)

EP 1 314 832 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
18.07.2007 Bulletin 2007/29

(51) Int Cl.:
E04F 10/06^(2006.01)

(21) Application number: **01870254.8**

(22) Date of filing: **22.11.2001**

(54) **Screen structure including bend**

Schirmgerüst mit einem Winkelstück

Structure d'écran avec un coude

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR**

(43) Date of publication of application:
28.05.2003 Bulletin 2003/22

(73) Proprietor: **Harol International N.V.**
3290 Diest (BE)

(72) Inventors:
• **Draelants, Camiel**
3472 Kortenaken (BE)

• **Croenen, Kevin**
2300 Turnhout (BE)

(74) Representative: **Van Malderen, Joëlle et al**
pronovem - Office Van Malderen
Avenue Josse Goffin 158
1082 Bruxelles (BE)

(56) References cited:
EP-A- 0 608 720 **EP-A- 0 918 118**

EP 1 314 832 B1

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

Field of the invention

[0001] The present invention is related to screen structures, in particular roller blinds used as awnings and the like. It is more specifically related to roller blinds which make a bend, preferably over a variable angle.

State of the art

[0002] Document EP-A-0918118 is presented as the closest prior art. It concerns a screen structure, comprising two guides for accommodating between them an end member to which a screen is attached. The screen can - at the other end - be rolled up onto a drum. Each guide comprises straight parts and a hinge joint which is arranged between said straight parts. The hinge joint comprises a central shell part and two adjoining side shell parts, which execute a controlled movement with respect to the central shell part. Due to the specific hinge design, the side shell parts are forced to be placed symmetrically with respect to the central shell part, at any angle of the hinge joint.

[0003] In the above cited document, the end member is attached to wheeled carriages which roll on tracks on the insides of the straight guide parts and inside the hinge joint. The wheels must necessarily roll over a transition from a track inside the straight guide to a track inside the joint and again when moving from the joint to the adjacent straight guide. This is a problematic item of all prior art designs. Due to the variability of the joint's angle, it is impossible to provide a smooth transition of the wheels from the straight guide to the joint and vice versa. In most positions of the joint, this transition will occur with an irregularity in the carriage movement, or a shock, which is detrimental in terms of wear and user friendliness of the structure.

[0004] Another problem of prior art designs is that they are insufficiently protected from torsional movement of the straight guide parts with respect to the hinge joint.

Aims of the invention

[0005] The present invention aims to provide a screen structure with a variable bend, wherein a perfectly smooth movement of the screen through the bend is possible, i.e. without any irregularity or shock of that movement.

[0006] It is a further aim of the invention to provide a screen structure having straight guide parts with improved resistance to torsional forces.

Summary of the invention

[0007] The present invention is related to a screen structure comprising a set of at least two guide members and at least one end member, said end member being

guided at its edges by said guide members, a screen being attached to said end member, each of said guide members comprising a first straight part and at least one additional straight part, each of said guide members further comprising at least one hinge joint between two adjacent straight parts, said hinge joint comprising a plurality of shell parts, of which at least two are connected to said straight guide parts, characterised in that :

- 10 - said hinge joint further comprises a plurality of guiding plates placed in an essentially vertical position, the assembled top ridges of said guiding plates forming a continuous curve, in every position of said two adjacent straight guide parts,
- 15 - said end member comprises a first means for rolling or gliding in said straight guide parts, and a second means for rolling or gliding on the top ridge of said guiding plates.

20 [0008] According to the preferred embodiment of the present invention, said first means for rolling or gliding is a first set of wheels, and wherein said second means for rolling or gliding is a second set of wheels.

[0009] Preferably, said second set of wheels are placed on the same set of axes as said first set of wheels.

25 [0010] According to the invention, said hinge joint preferably comprises three shell parts, one central shell part and two side shell parts, said side shell parts being rigidly attached to said straight guide parts, and said side shell parts being able to rotate with respect to said central part and wherein three guiding plates are present, a central guiding plate attached to said central shell part, and two side plates attached to said side shell parts.

30 [0011] The screen structure of the invention preferably comprises a pulling chord or belt and a plurality of guide rolls inside said hinge joint, for guiding said chord or belt.

35 [0012] Furthermore, said second set of wheels preferably has a U-shaped outer profile.

40 [0013] In the preferred embodiment of the screen structure according to the invention, the connection between a shell part and a straight guide part takes place by two extensions of said shell part, said extensions fitting into hollow spaces inside said straight guide part, the first extension lying to one side of an axis around which torsion of said straight guide part is possible, the other extension lying to the opposite side.

Short description of the drawings

50 [0014] Fig. 1 represents a view of a screen structure according to the invention.

[0015] Fig. 2 represents a detailed view of the hinge joint according to the invention.

55 [0016] Fig. 3 represents an exploded version of the view of figure 2

[0017] Fig. 4 represents a view of the main characteristic parts of the end member according to the invention.

[0018] Fig. 5 and 6 show side views of the hinge joint

of the invention, installed at 90°.

[0019] Fig. 7 describes the profile of the straight guide parts according to the invention.

Detailed description of the invention

[0020] A screen structure of the invention is shown in figure 1. It comprises two parallel guides 1, of which one is shown in the drawing. Each guide consists of two straight parts 2 and 3 with a variable-angle hinge joint 4 in between. A support roll 5 is present between two joints 4, and carried in bearings which allow rotation of the roll 5 with respect to the joints. The screen (not shown), which is normally a textile cloth, is wound onto a drum 6. The drum 6 and/or the guides 1 may be attached to a rigid structure, such as a wall, a veranda, or other. One free end of the screen is then attached to an end member 7, placed in between the guides 1. The end member 7 can be moved whilst remaining essentially parallel to the drum 6, thereby unrolling or rolling up the screen, equivalent to closing or opening it. The pulling and retracting of the screen can be done by a motor which drives the drum 6 and by cables, tapes, or chords present inside the guides 1 and attached to the end member 7. Also, tensioning springs are present for keeping the screen in a tensioned condition during the movement. The features described so far are known in the art.

[0021] The screen structure of the invention is characterised by a specific design of the hinge joint 4, which is present in each of the parallel guides 1, and which in the case of figure 1 is a variable angle joint. The invention is also related to the design of the end member 7 and the means for guiding said end member 7 through the guides 1 and the joint 4 of the invention. The invention is further characterised by an improved connection between the hinge joint 4 and the straight guide parts 2 and 3, in order to have a better resistance against torsional forces.

[0022] Figures 2 and 3 show a preferred embodiment of the hinge joint 4 in more detail. Figure 4 shows the parts of the end member 7 which are essential to the invention. As seen in figures 2 and 3, the joint 4 comprises two identical (but mirrored) side shells 10, attached to the straight guide parts 2, 3 to form projected extensions of said straight parts. In between these two projected shells 10, is the central shell 11. The projected shells 10 are attached rigidly to the straight guide parts 2 and 3, by means of extensions 32 which fit into hollow portions of the straight guides 2 and 3. An additional extension 33 is present on the projected shells 10 for obstructing torsional movement between the straight parts 2 and 3 and the projected shells 10. This is explained in more detail later in the text.

[0023] The projected shells 10, and with them, the straight guide parts 2 and 3, are connected to the central shell 11 by way of screws 34, which leave the possibility of a rotation, around axes 12, of the straight parts 2 and 3, relative to the central shell 11. In this way an angle between the straight guide parts 2 and 3 can be installed.

This angle preferably lies between 90° and 180°. Depending on the construction details of the hinge joint, the minimum angle that can be installed may be lower than 90°, for example around 70°.

5 **[0024]** At the top of the projected shells 10 and the central shell 11 are caps 13, which may overlap to a degree, according to the desired angle between the straight guide parts 2 and 3. Guide rolls 16 are present inside the joint, for guiding the pulling chord 17.

10 **[0025]** On the inner vertical side of the joint, are three guiding plates, for example metal plates : a central guiding plate 20 and two side plates 21. These plates form a characteristic of the invention. The central plate 20 is attached to the central shell 11, while the two side plates 21 are attached to the projected shells 10. The side plates 21 and central plate 20 overlap over a circular area 18, the centre of which coincides with the rotational axis 12. The side plates 21 are attached to the side shells 10 by screws 35. At their section point with the axis 12, the central plate 20 is attached to the central shell part 11, via the screws 36, which are screwed into the hollow end of the screws 34. The side plate 20 and central plates 21 comprise circular portions 40 which lie adjacent to each other and which have their centre point in the centre of area 18. In this way, the side plates 21 can make the same rotational movement as the side shells 10, with respect to the central plate 20 and central shell 11, respectively. The thickness of the overlapping portion 18 of the side plates 21 is preferably smaller than the thickness of the rest of the side plates 21. The central plate 20 has an opening 30 for carrying the support roll 5. In the opening 30, a bearing 45 is present for allowing the support roll 5 to rotate.

30 **[0026]** The function of the guiding plates 20, 21 is to ensure a smooth transition of the end member 7 through the hinge joint 4. In figure 4, it is seen that the end member 7 is equipped with a triple set of wheels. The primary set of two wheels 22 serves to move the end member 7 through the straight guide parts 2 and 3. This is shown in figure 2, where the end member 7 is positioned in the upper part of the screen structure, above the joint 4. The wheels 22 are forced to roll in tracks 24 on the inside of the guide parts 2 and 3. The second set of wheels 23 shares the same axes 25 with the first set 22 and is placed between said first set 22 and the end member body. A third set of wheels 28, placed between the first and second set serves as a guide for the pulling chord 17, which runs inside the guides 1 and the end member 7. The wheel 26 which is placed in the opening 27, is used for guiding the pulling chord into the end member 7, towards the spring (not shown) which is placed inside this end member.

45 **[0027]** The invention is characterised by the presence of the second set of wheels 23. This second set of wheels 23 is placed in such a way that they take over the function of carrying the end member 7 as soon as this end member enters the joint 4. When moving for example from top to bottom, the end member enters the joint 4 at point 38

(see figure 5). Simultaneous with or immediately after this point, the secondary wheels 23 land onto the first guiding plate 21 and roll consecutively over this plate, the central plate 20 and the opposite side plate, until the end member 7 leaves the joint, at which point the support of the end member is taken over again by the primary wheels 22. As seen on figure 4, the secondary wheels 23 may have a cylindrical shape. They may have another profile, for example a U-shaped profile, similar to the profile of the cable supporting wheels 28, which will ensure a firmer grip of these wheels 23 on top of the narrow guiding plates 20,21. The diameter of the wheels 23, and of the third set 28 is preferably smaller than that of the primary wheels 22, so that while the end member is supported by the straight guide parts 2 or 3, these wheels 23 and 28 do not make contact with the inside of said guide parts.

[0028] As soon as the secondary wheels 23 have made contact with the guiding plates, the primary wheels 22 are no longer supported. In fact, inside the joint, there is no track at all for these primary wheels, who are carried 'in flight' until they make contact again with the track of the next straight guide part. The side view of figure 5 illustrates the smooth transition from the straight part 2 to the joint 4. The top ridge 41 of the side plates 21 has a slightly curved shape, in order to gradually lift up the end member by the secondary support wheels 23. The shape of this top ridge 41 defines the moment when the carrying function is transferred from the primary wheels 22 to the secondary wheels 23. In order to have a smooth transition, the primary wheels 22 must support the end member at least until the moment when the secondary wheels 23 have made contact with the guiding plates 21.

[0029] As seen in figure 5, the guiding plates have a shape which allows a smooth and shock-free transition through the joint, i.e. from one guiding plate to the adjacent one. In every position (every angle), the top ridges of the assembled guiding plates 20, 21 form a continuous curve, as the top of the side plates 21 is always tangent to the top of the central plate 20. An added advantage is due to the fact that inside the joint, no track is present for the primary wheels, so more space is available inside the joint for the passing of the pulling chord 17. The absence of tracks inside the joints allows the wheels 22 to move through the joint without any shocks taking place.

[0030] As an alternative to the overlapping guiding plates 20, 21 as shown in the drawings, the present invention also covers guiding plates which do not overlap, but are fully adjacent to each other. In this way, the plates are made of the same thickness and their shape, as seen in a section perpendicular to the rotation axis is defined by the visible parts of the plates described above, and shown for example in figure 5.

[0031] The guiding plates 20,21 also perform the function of closing off - at least partially - the hinge joint on the inside. In this way, the hinge joint 4 is protected on all sides from the surrounding environment.

[0032] Some additional features of the preferred em-

bodiment can be derived from the figures. An indicator 31 is present on the inside of the side shells 10. This gives an indication of the relative position of the side shells 10, and thus also of the straight guide parts 2 and 3, with respect to the central shell part 11. As can be understood from the construction, the side shells 10 are not necessarily symmetric with respect to the central part. This set-up allows a more flexible positioning of the screen.

[0033] The guide rolls 16 are also a characterising feature. In prior art designs, the cable or belt often runs on flat surfaces inside the joint, which is a cause for excessive wear of this belt and of said flat surfaces. Because of the lack of supporting tracks inside the shells, there is room for these guide rolls 16, which allow a much smoother transition of the chord 17. According to the preferred embodiment, a chord is used in stead of a belt. In fact, inside the joint, the chord now only makes contact with the guide rolls' limited surface, which helps to avoid premature wear of the chord. Figure 6 shows a view of how this chord runs through the joint. The use of a belt in stead of a chord is not excluded by the present invention.

[0034] According to an alternative embodiment of the present invention, the second set of wheels 23 which run on top of the guiding plates can have a separate axis, which is not identical with the axis of the first set of wheels 22.

[0035] Figure 7 shows the profile of the straight guide parts 2 and 3 according to the preferred embodiment. The area 50 corresponds to the place where the extensions 32 of the side shell parts fit. Area 51 is the area into which the additional extension 33 fits. The position of area 51 is such that it is placed on the opposite side of any axis around which torsional forces operate on the interface between straight guide parts 2, 3 and the hinge joint 4. This feature allows therefore a better resistance to such torsional forces.

[0036] It is emphasised that the above describes a screen structure which is generally characterised by the combination of the vertical guiding plates 20, 21 and the secondary set of wheels 23. This can be done in a hinge joint of another design, for example having a single rotational axis, as will be appreciated by anyone skilled in the art. The invention is therefore not limited to the particular design as described above and as shown in the drawings. It is also possible to have a screen with more than two guide members 1 and/or to have more than two straight guide parts (2,3) in each guide member and to provide hinge joints according to the invention, between adjacent guide parts.

[0037] As another alternative, the end member 7 may be designed - still according to the invention - so that it glides over the guiding plates, in stead of rolling over it. To that effect, the wheels 23 may be replaced by fixed cylinders or other structures, or they may be left out altogether, leaving the bare axes 25 to glide over the guiding plates 20 and 21.

Claims

1. A screen structure comprising a set of at least two guide members (1) and at least one end member (7), said end member (7) being guided at its edges by said guide members (1), a screen being attached to said end member (7), each of said guide members (1) comprising a first straight part (2) and at least one additional straight part (3), each of said guide members (1) further comprising at least one hinge joint (4) between two adjacent straight parts (2,3), said hinge joint comprising a plurality of shell parts (10,11), of which at least two are connected to said straight guide parts (2,3), **characterised in that:**
 - said hinge joint (4) further comprises a plurality of guiding plates (20,21) placed in an essentially vertical position, the assembled top ridges of said guiding plates forming a continuous curve, in every position of said two adjacent straight guide parts (2,3),
 - said end member (7) comprises a first means for rolling or gliding in said straight guide parts (2,3), and a second means for rolling or gliding on the top ridge of said guiding plates (20,21).
2. A screen structure according to claim 1, wherein said first means for rolling or gliding is a first set of wheels (22), and wherein said second means for rolling or gliding is a second set of wheels (23).
3. A screen structure according to claim 2, wherein said second set of wheels (23) are placed on the same set of axes (25) as said first set of wheels.
4. A screen structure according to any one of claims 1 to 3, wherein said hinge joint (4) comprises three shell parts, one central shell part (11) and two side shell parts (10), said side shell parts (10) being rigidly attached to said straight guide parts (2,3), and said side shell parts (10) being able to rotate with respect to said central part (11) and wherein three guiding plates are present, a central guiding plate (20) attached to said central shell part (11), and two side plates (21) attached to said side shell parts (10).
5. A screen structure according to any one of claims 1 to 4, comprising a pulling chord or belt (17) and a plurality of guide rolls (16) inside said hinge joint (4), for guiding said chord or belt (17).
6. A screen structure according to any one of claims 2 to 5, wherein said second set of wheels (23) has a U-shaped outer profile.
7. A screen structure according to any one of the preceding claims, wherein the connection between a shell part (10) and a straight guide part takes place

by two extensions (32,33) of said shell part, said extensions fitting into hollow spaces (50,51) inside said straight guide part, the first extension (32) lying to one side of an axis around which torsion of said straight guide part is possible, the other extension (33) lying to the opposite side.

Patentansprüche

1. Abschirmungsstruktur, umfassend einen Satz von mindestens zwei Leitvorrichtungen (1) und mindestens ein Endelement (7), wobei das Endelement (7) an den Kanten von den Leitvorrichtungen (1) geleitet wird, eine Abschirmung, die an dem Endelement (7) befestigt ist, jede der Leitvorrichtungen (1) umfassend eine erste gerade Leitvorrichtung (2) und mindestens eine weitere gerade Leitvorrichtung (3), und jede der Leitvorrichtungen (1) weiter umfassend mindestens ein Scharnier (4), das sich zwischen zwei angrenzenden geraden Leitvorrichtungen (2,3) befindet, das Scharnier umfassend mehrere Hülsesteile (10, 11), von denen mindestens zwei mit den geraden Leitvorrichtungen (2,3) verbunden sind, **dadurch gekennzeichnet, dass:**
 - das Scharnier (4) weiter mehrere Leitplatten (20, 21) umfasst, die sich in einer wesentlich vertikalen Position befinden, wobei die eingebauten Oberkanten der Leitplatten in jeder Position der zwei angrenzenden geraden Leitvorrichtungen (2,3) eine beständige Kurve formen,
 - das Endelement (7) ein erstes Mittel zum Rollen oder Gleiten in die geraden Leitvorrichtungen (2,3) und ein zweites Mittel zum Rollen oder Gleiten über die Oberkante der Leitplatten (20, 21) umfasst.
2. Abschirmungsstruktur nach Anspruch 1, wobei es sich bei dem ersten Mittel zum Rollen oder Gleiten um einen ersten Satz an Rollen (22) handelt und bei dem zweiten Mittel zum Rollen oder Gleiten um einen zweiten Satz von Rollen (23).
3. Abschirmungsstruktur nach Anspruch 2, wobei sich der zweite Satz an Rollen (23) auf demselben Satz von Achsen (25) wie der erste Satz an Rollen befindet.
4. Abschirmungsstruktur nach einem der Ansprüche 1 bis 3, wobei das Scharnier (4) drei Hülsesteile, ein zentrales Hülsesteil (11) und zwei seitliche Hülsesteile (10) umfasst, wobei die seitlichen Hülsesteile (10) starr an den geraden Leitvorrichtungen (2,3) befestigt sind, und die seitlichen Hülsesteile (10) sich hinsichtlich dem zentralen Teil (11) drehen können, und wobei drei Leitplatten vorhanden sind, und eine zentrale Leitplatte (20) an dem zentralen Hülsesteil

(11) befestigt ist und zwei seitliche Platten (21) an den seitlichen Hülsenteilen (10) befestigt sind.

5. Abschirmungsstruktur nach einem der Ansprüche 1 bis 4, umfassend einen Gurt oder Riemen zum Ziehen (17) sowie mehrere Leitrollen (16) innerhalb des Scharniers (4) zum Leiten des Gurtes oder Riemens (17).
6. Abschirmungsstruktur nach einem der Ansprüche 2 bis 5, wobei der zweite Satz an Rollen (23) eine U-förmige, äußere Form aufweist.
7. Abschirmungsstruktur nach einem der vorhergehenden Ansprüche, wobei die Verbindung zwischen einem Hülsenteil (10) und einer geraden Leitvorrichtung über zwei Verlängerungen (32, 33) des Hülsenteils erfolgt, wobei die Verlängerungen in die Hohlräume (50, 51) innerhalb der geraden Leitvorrichtung passen, so dass die erste Verlängerung (32) sich an einer Seite der Achse befindet, um die eine Verdrehung der geraden Leitvorrichtung möglich ist und die andere Verlängerung (33) sich auf der gegenüberliegenden Seite befindet.

Revendications

1. Structure d'écran comprenant un ensemble d'au moins deux éléments de guidage (1) et d'au moins un élément d'extrémité (7), ledit élément d'extrémité (7) étant guidé à ses bords par lesdits éléments de guidage (1), un écran étant fixé sur ledit élément d'extrémité (7), chacun desdits éléments de guidage (1) comprenant une première partie droite (2) et au moins une partie droite supplémentaire (3), chacun desdits éléments de guidage (1) comprenant en outre au moins une charnière (4) entre deux parties droites adjacentes (2, 3), ladite charnière comprenant une pluralité de parties d'enveloppe (10, 11), dont au moins deux sont reliées auxdites parties de guidage droites (2,3), **caractérisée en ce que** :

- ladite charnière (4) comprend en outre une pluralité de plaques de guidage (20, 21) placées dans une position essentiellement verticale, les nervures supérieures assemblées desdites plaques de guidage formant une courbe continue, dans chaque position des deux dites parties de guidage droites adjacentes (2,3),
- ledit élément d'extrémité (7) comprend un premier moyen d'enroulement ou de glissement dans lesdites parties de guidage droites (2,3) et un second moyen d'enroulement ou de glissement sur la nervure supérieure desdites plaques de guidage (20, 21).

2. Structure d'écran selon la revendication 1, dans la-

quelle ledit premier moyen d'enroulement ou de glissement est un premier ensemble de roues (22) et dans laquelle ledit second moyen d'enroulement ou de glissement est un second ensemble de roues (23).

3. Structure d'écran selon la revendication 2, dans laquelle ledit second ensemble de roues (23) est placé sur le même ensemble d'axes (25) que ledit premier ensemble de roues.
4. Structure d'écran selon l'une quelconque des revendications 1 à 3, dans laquelle ladite charnière (4) comprend trois parties d'enveloppe, une partie d'enveloppe centrale (11) et deux parties d'enveloppe latérales (10), lesdites parties d'enveloppe latérales (10) étant fixées de manière rigide sur lesdites parties de guidage droites (2, 3) et lesdites parties d'enveloppe latérales (10) pouvant tourner par rapport à ladite partie centrale (11), et dans laquelle il y a trois plaques de guidage, une plaque de guidage centrale (20) fixée sur ladite partie d'enveloppe centrale (11) et deux plaques latérales (21) fixées sur lesdites parties d'enveloppe latérales (10).
5. Structure d'écran selon l'une quelconque des revendications 1 à 4, comprenant une corde ou une courroie de traction (17) et une pluralité de rouleaux de guidage (16) à l'intérieur de ladite charnière (4) pour guider ladite corde ou ladite courroie (17).
6. Structure d'écran selon l'une quelconque des revendications 2 à 5, dans laquelle ledit second ensemble de roues (23) a un profil externe en forme de U.
7. Structure d'écran selon l'une quelconque des revendications précédentes, dans laquelle le raccordement entre une partie d'enveloppe (10) et une partie de guidage droite est effectué par deux extensions (32, 33) de ladite partie d'enveloppe, lesdites extensions s'ajustant dans des espaces creux (50, 51) à l'intérieur de ladite partie de guidage droite, la première extension (32) se trouvant sur un côté d'un axe, autour duquel la torsion de ladite partie de guidage droite est possible, l'autre extension (33) se trouvant sur le côté opposé.

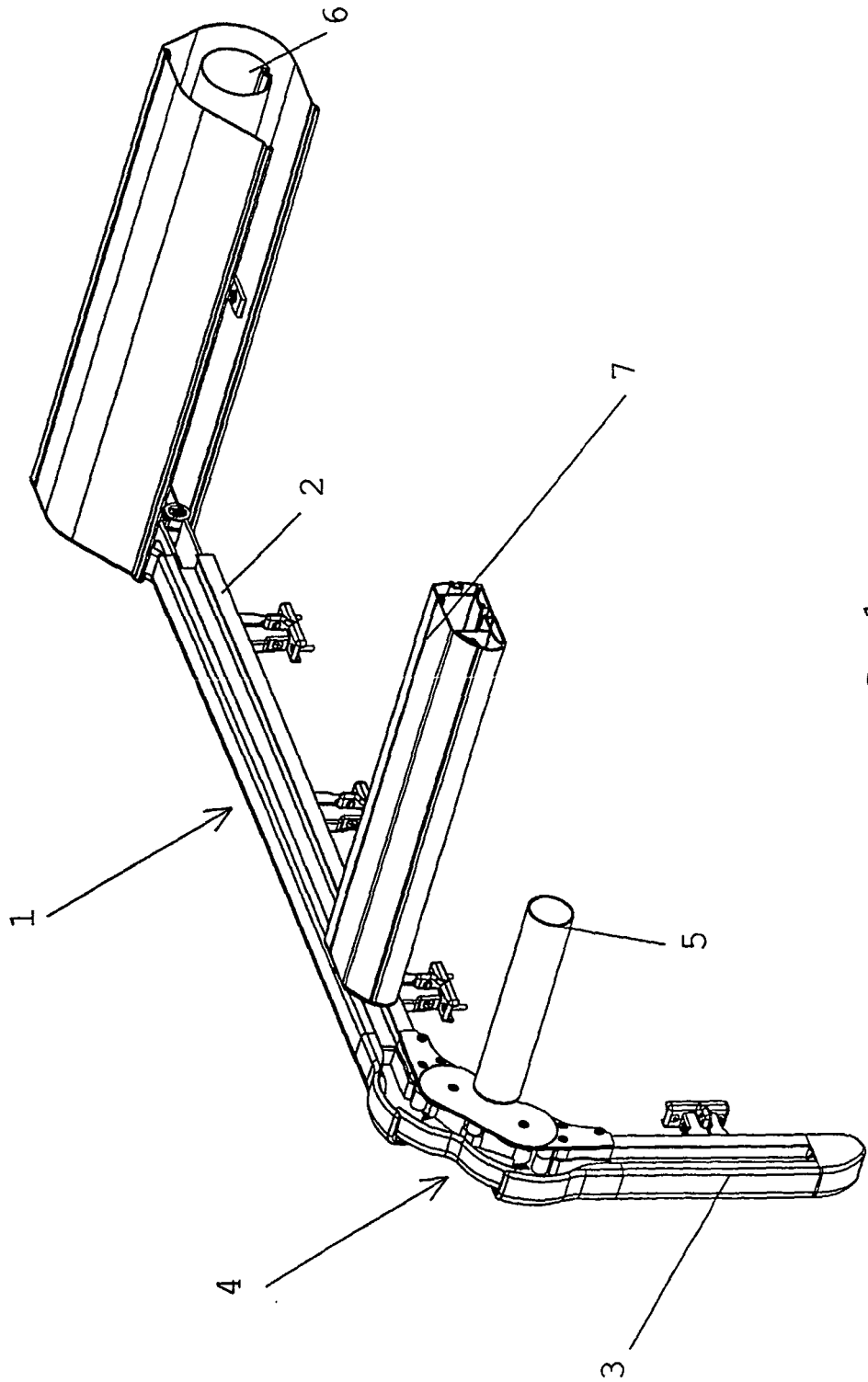


FIG. 1

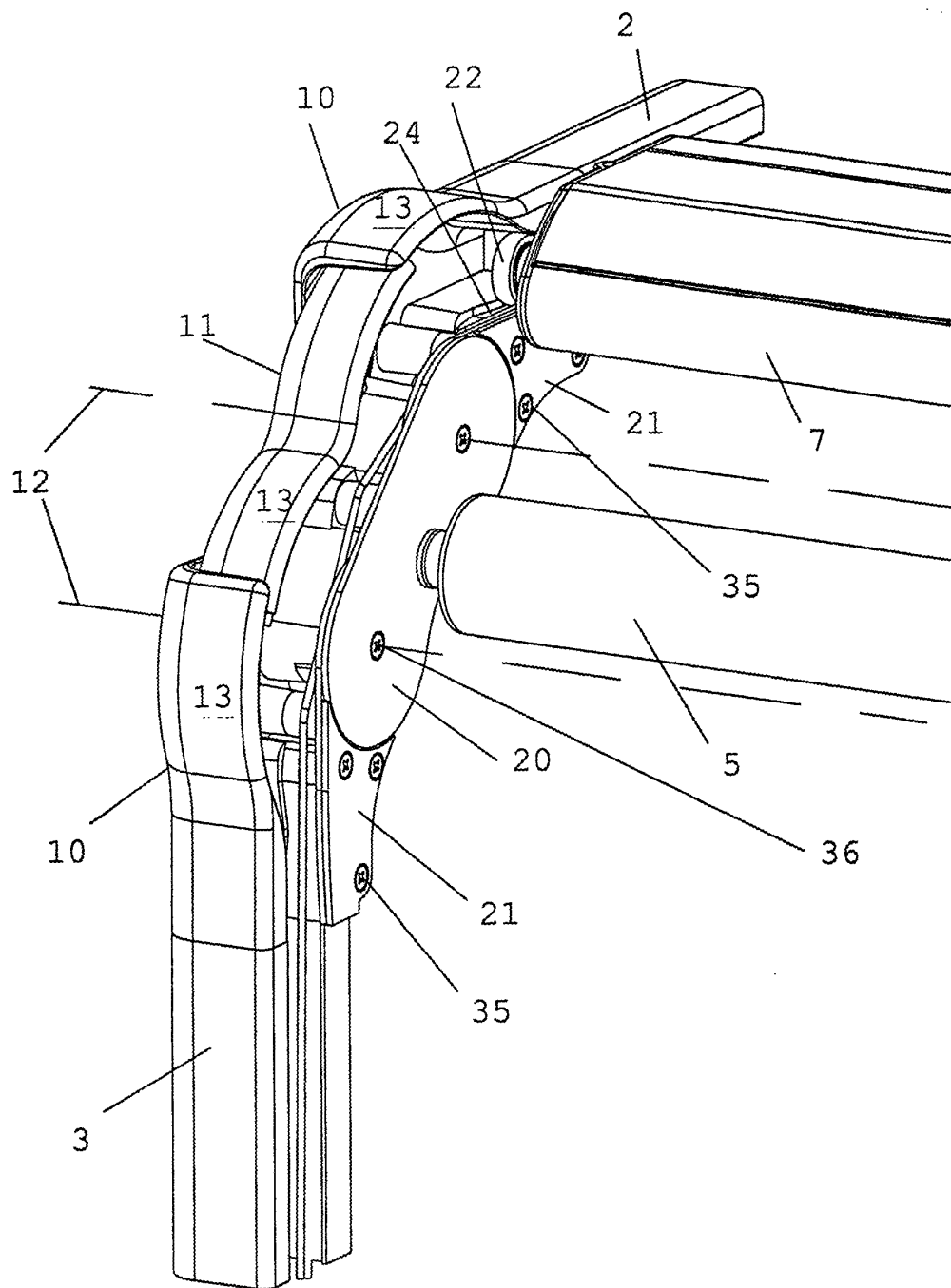


FIG. 2

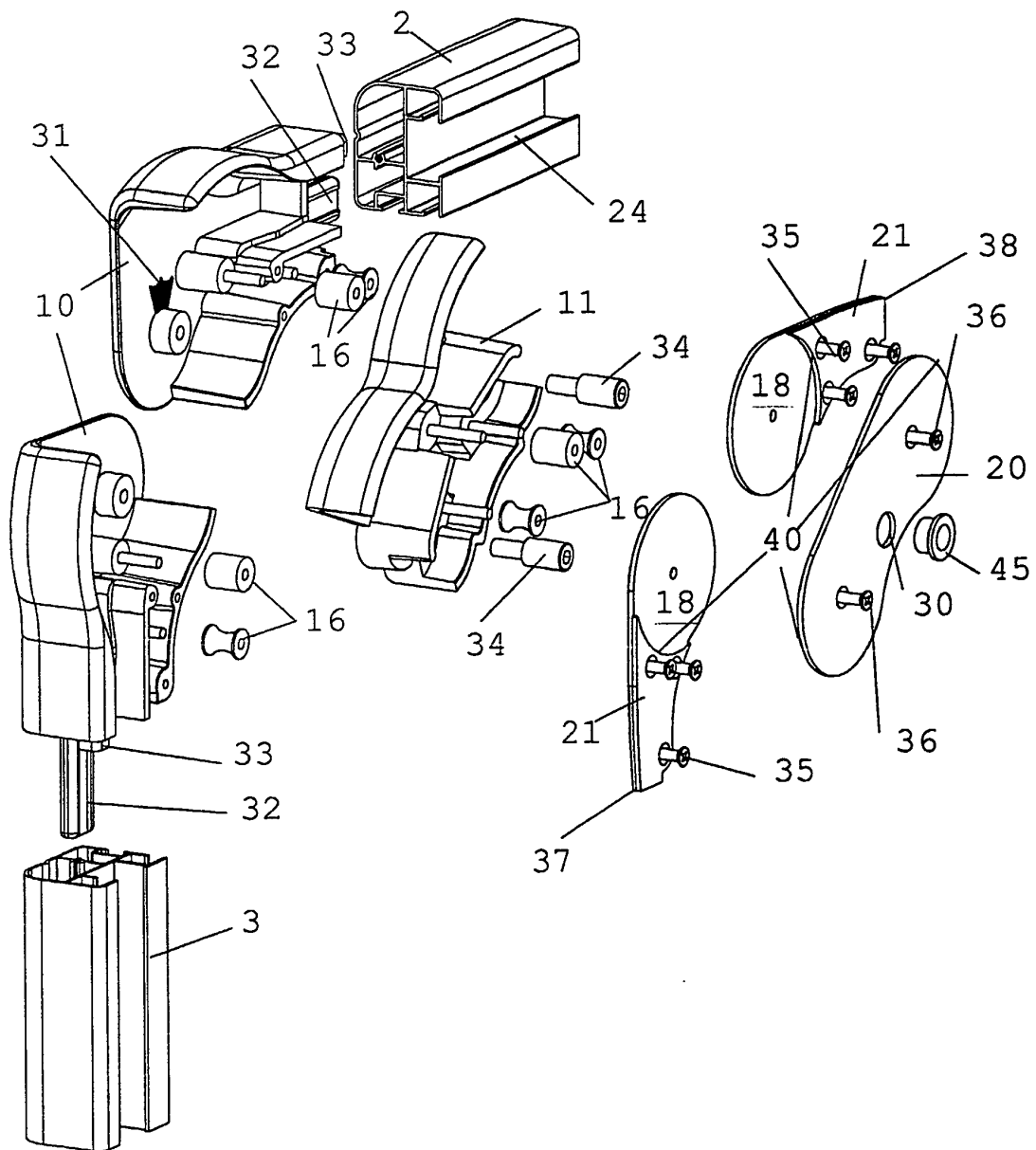


FIG. 3

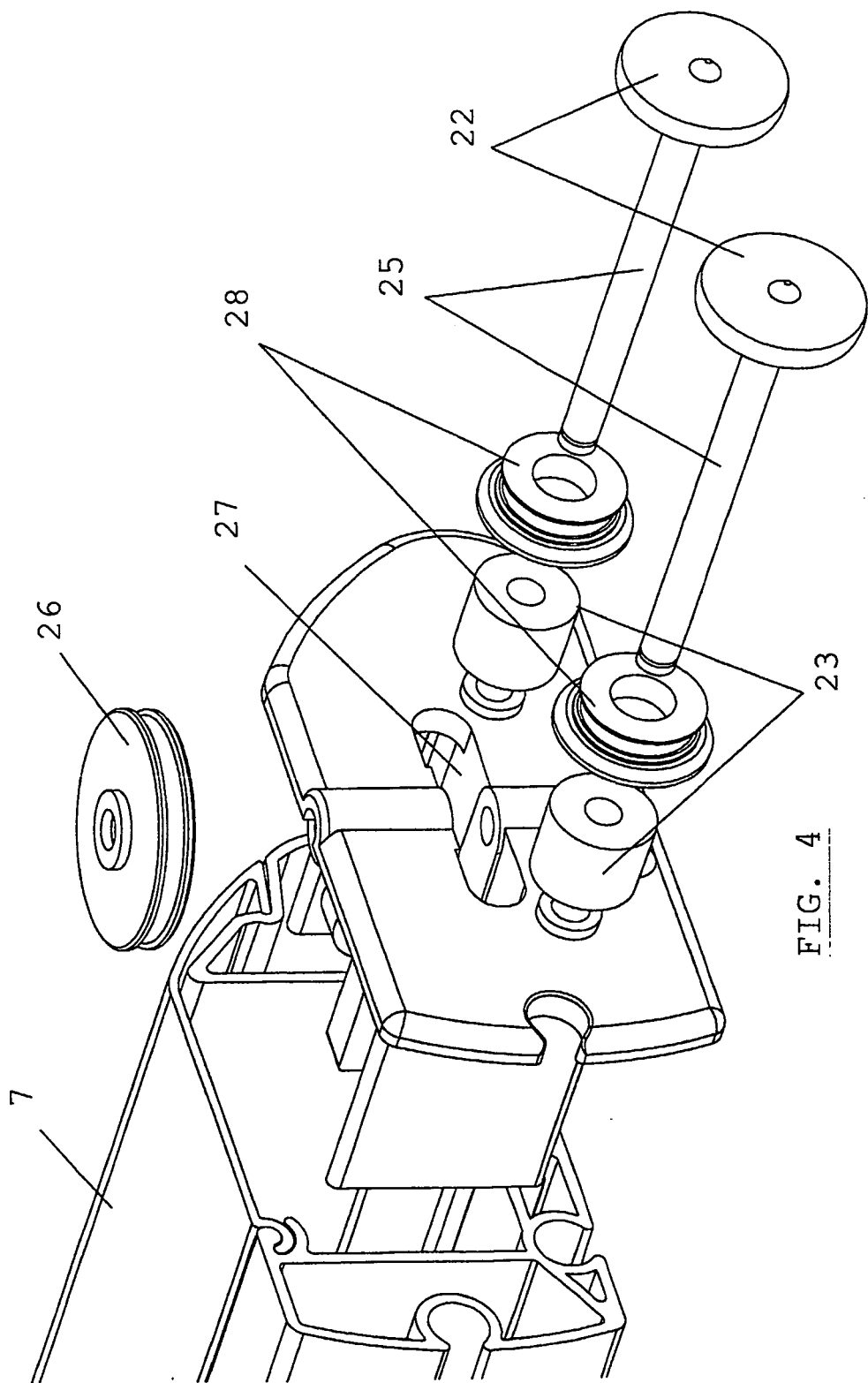


FIG. 4

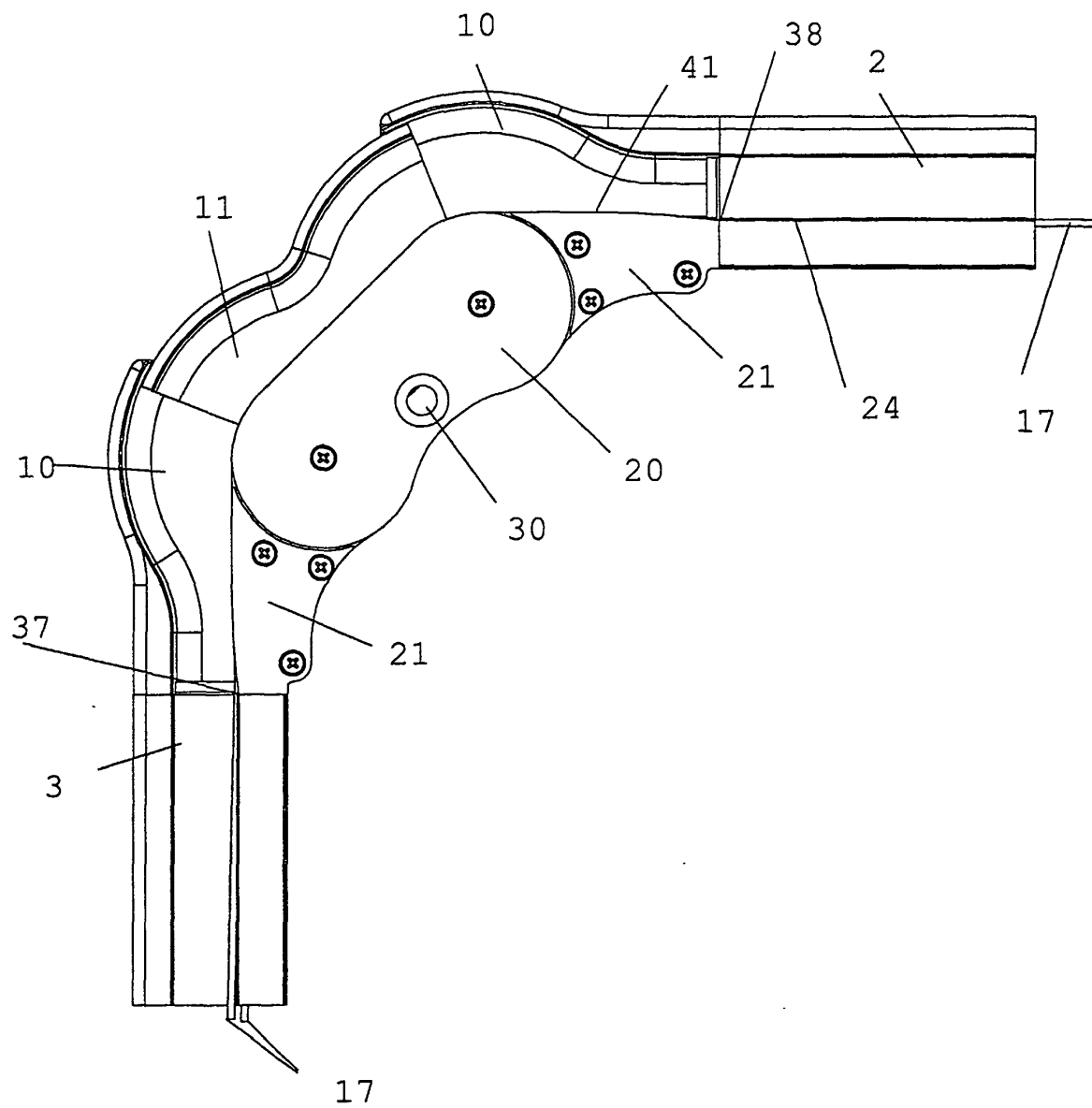


FIG. 5

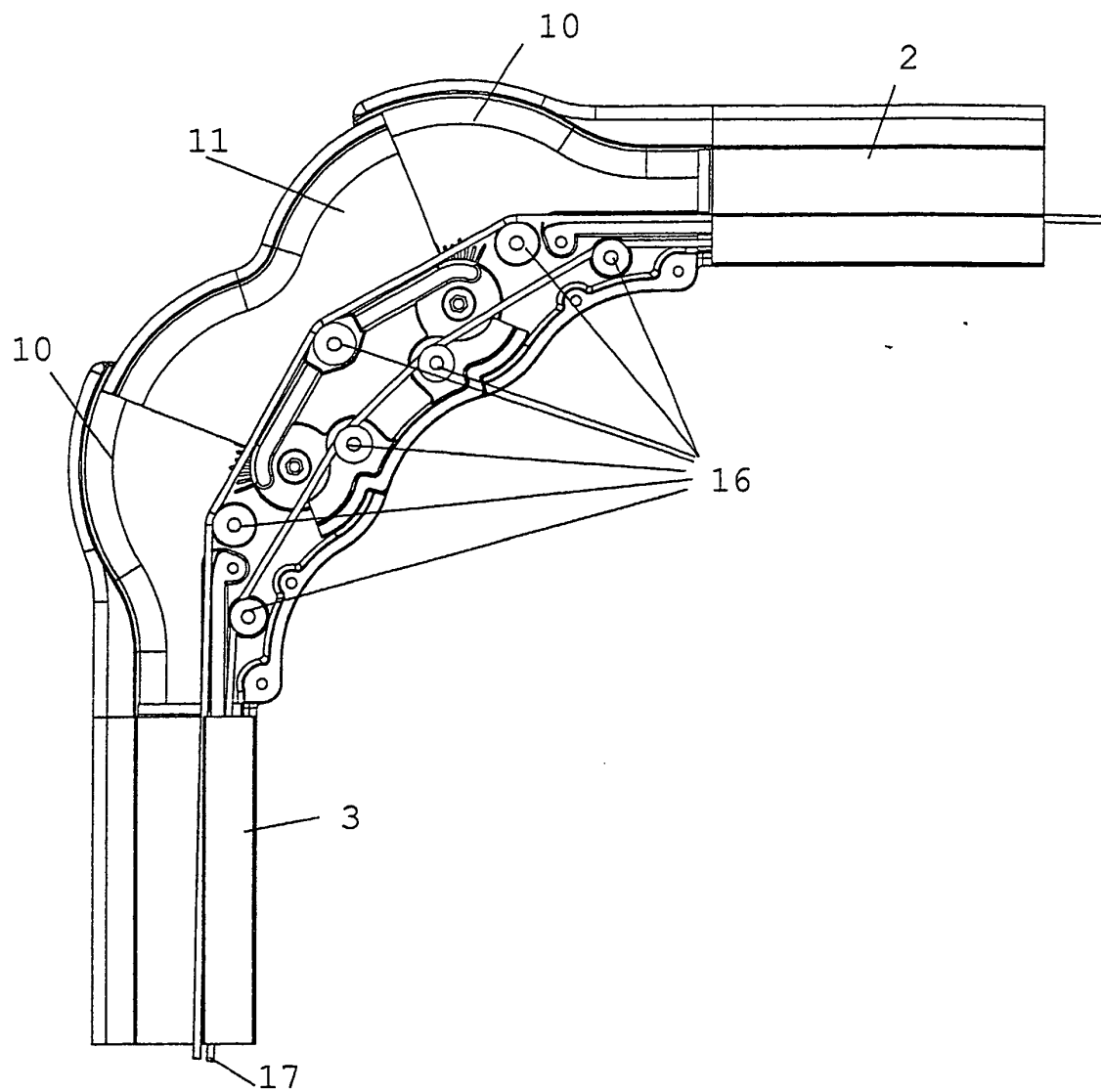


FIG. 6

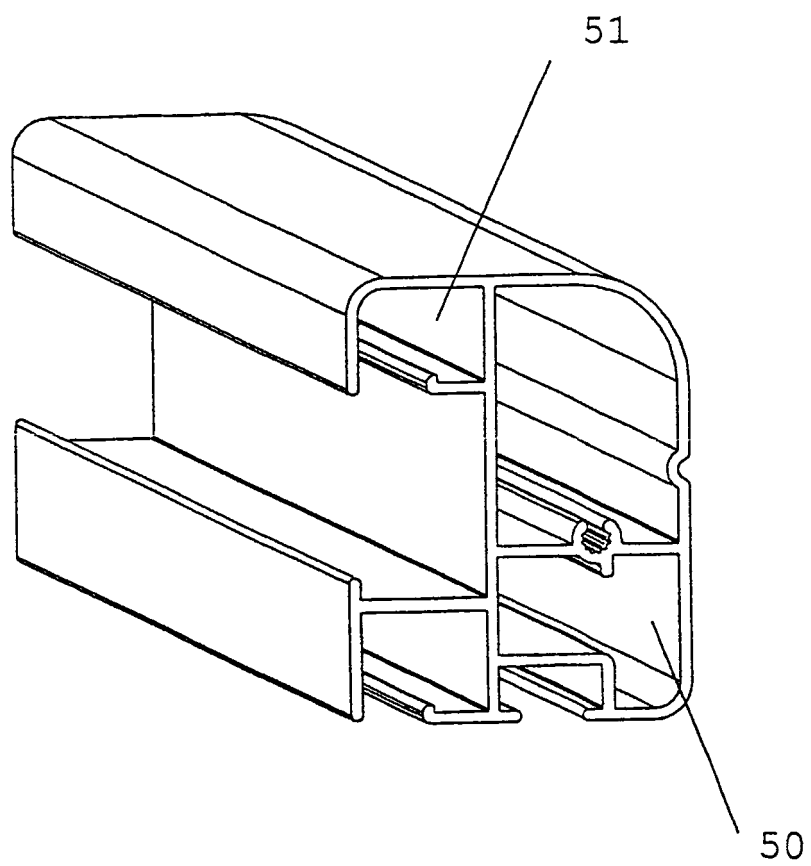


FIG. 7

REFERENCES CITED IN THE DESCRIPTION

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

Patent documents cited in the description

- EP 0918118 A [0002]