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

(11) **EP 4 041 978 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
10.05.2023 Bulletin 2023/19

(21) Application number: **20775159.5**

(22) Date of filing: **29.09.2020**

(51) International Patent Classification (IPC):
E06B 9/34 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
E06B 9/34; E06B 2009/1555; E06B 2009/1583

(86) International application number:
PCT/IB2020/059091

(87) International publication number:
WO 2021/070003 (15.04.2021 Gazette 2021/15)

(54) **ROLLER SHUTTER WITH ORIENTABLE SLATS PROVIDED WITH A SIMPLIFIED MEANS FOR ANGULAR ROTATION**

ROLLLADEN MIT AUSRICHTBAREN LATTEN MIT VEREINFACHTER VORRICHTUNG ZUR WINKELDREHUNG

VOLET ROULANT À LAMES ORIENTABLES DOTÉ D'UN MOYEN SIMPLIFIÉ DE ROTATION ANGULAIRE

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

(30) Priority: **10.10.2019 IT 201900018392**

(43) Date of publication of application:
17.08.2022 Bulletin 2022/33

(73) Proprietor: **Mancuso, Giovanni**
88100 Catanzaro (IT)

(72) Inventors:
- **GIAMPA', Francescantonio**
88100 Catanzaro (IT)
- **MANCUSO, Giovanni**
88100 Catanzaro (IT)

(74) Representative: **Sandri, Sandro**
Bugnion S.P.A.
Via Pancaldo 68
37138 Verona (IT)

(56) References cited:
EP-A1- 2 811 103
EP-A1- 3 221 544
EP-B1- 3 221 544
JP-A- 2013 151 812
US-A1- 2019 271 155

EP 4 041 978 B1

Description

FIELD OF APPLICATION

[0001] The present invention relates to a roller shutter with orientable slats provided with a simplified means for angular rotation of the slats themselves.

[0002] More precisely, the roller shutter with orientable slats according to the invention, destined to allow the closure of doors and windows to form a barrier to the outside, provides for the movement of the slats themselves, unlike known solutions, to be carried out using an extremely reduced number of components, with a considerable advantage both from the production point of view due to the reduction in the number of components used, and from the point of view of product reliability.

[0003] Basically, the roller shutter according to the invention provides for each slat to be associated with a respective support called "slat holder" which is simultaneously connected to two elements of support and of transmission of the rotary motion called "chains". That is, each slat holder is connected to its corresponding chain and to the one located immediately above, thus avoiding any direct connection between the slats themselves.

[0004] The present invention finds application in the field of frames, doors and windows, shutters and blinds, which can be used mainly in the civil field, but also in the industrial sector.

PRIOR ART

[0005] It is known that a shutter is constituted by a plurality of horizontal sticks, or slats, joined together in a flexible way, so as to be able to wind on a roller located above the window frame in a compartment called "box".

[0006] Many models of roller shutters are known and the first evolution is the one described in document EP2398993 according to which the slats are of the orientable type, since the shutter is made using a plurality of slats constrained together, but with freedom of angular movement so that they can be oriented allowing the passage of light and air when the shutter is fully lowered. Said slats, like in a traditional shutter, vertically slide in lateral guides during the winding and unwinding steps produced by the rotation of the winding roller which can be operated manually or by motorization.

[0007] According to this first evolution, the slats are oriented one at a time starting from the bottom following the progressive unwinding of the shutter, after it has rested on the threshold of the wall compartment in which the shutter itself is located. This type of orientable shutter requires the use of additional profiles to support the slats and said profiles participate in the function of orientation of the slats, and this causes a certain limitation of the angle of orientation of the slats themselves, as this angle is produced by the connection between each slat and an additional curl-shaped profile located on each adjacent slat, since if a certain limit of the orientation angle were exceeded, the slats would be released.

[0008] It is also known that according to document EP2722475 there is a second evolution of the orientable shutters which provides for the simultaneous orientation of the slats. In this case, the orientation of the slats is obtained by a mechanical device, actuated by the winding roller, which is in turn connected to a motion source. This mechanism therefore transmits the motion from one slat to another. The rotation of the roller allows winding and unwinding the shutter on the roller itself and, when it is fully lowered, orienting the slats simultaneously by means of said mechanism.

[0009] The mechanism is made up of several elements such as link or chain elements which, combined with slat supports, arms and connecting rods, allow the simultaneous movement of the slats by means of a special kinematic mechanism.

[0010] The aforementioned kinematic mechanism is permanently mechanically connected to the winding roller. Consequently, with the shutter completely lowered, when the roller rotates in the unwinding direction of the curtain, the kinematic mechanism is set in motion which in turn transmits the motion to the arms and from them to the pins integral with the slat supports rigidly constrained to the slats which then rotate in angular orientation making a maximum angle greater than 90°, while when the roller rotates in the winding direction, the slats rotate in the direction opposite to the previous one until they close completely.

[0011] According to other solutions, such as the one relating to document EP3221544, it is envisaged to realise a roller shutter of the type with orientable slats that can also be installed on standard guides, which, compared to traditional solutions, offers the double advantage of being able to be installed also on existing guides and of using a mechanical means which allows the orientation of the slats that make up the shutter by means of kinematic mechanisms without arms, which already represents a considerable simplification compared to the traditional mechanisms for simultaneously orientable shutters described above.

[0012] Further even more evolved solutions, such as the one described in document EP915227, envisage that as well as being of the slidable type in the guides and being of the angularly orientable type, the slats are also provided with a compacting/decompacting function through devices that can distance or near the longitudinal edges of the slats.

[0013] In other types of orientable shutters on the market such as those described in WO2016/166694 and EP382172 it happens that the numerous mechanical components used, precisely due to their number and complexity, remain visible especially when the slats are arranged in angular orientation, obtaining a rather onerous and nonetheless not aesthetically pleasing structure, which is above all dangerous for the hands during operation due to the absence of suitable protections.

[0014] In general, all these systems for moving traditional shutters suffer from the common drawback of requiring a large series of mechanical components that must be used to perform even complex functions, which components in the long run can also jam and therefore require constant assistance.

[0015] Furthermore, traditional shutters with orientable slats can, as mentioned, be subject to a limitation of the orientation angle and other similar drawbacks of a practical nature.

DESCRIPTION OF THE INVENTION

[0016] The present invention aims to provide a roller shutter with orientable slats provided with a simplified means for angular rotation of the slats themselves, thus creating a condition which is capable of eliminating or at least reducing the drawbacks highlighted above.

[0017] The invention aims in particular to provide a roller shutter with orientable slats provided with a simplified means for the operation thereof, which is realised using a very limited number of components, so as to obtain a structure with contained production costs, extremely functional and characterised by a linear aesthetic effect as it has no visible mechanical parts and support profiles.

[0018] This is achieved by means of a roller shutter with orientable slats provided with a simplified means for angular rotation of the slats themselves, the characteristics of which are described in the main claim.

[0019] The dependent claims of the present solution outline advantageous embodiments of the invention.

[0020] The main advantages of this solution concern the fact that the simplification of the components used makes the shutter easier to realise with a saving for the manufacturer and an economic advantage for the consumer as well, and also makes the shutter itself more functional in use also because it is possible to exploit a high angle of orientation of the slats.

[0021] According to one of the advantages proposed by the invention the limitation of the components used allows that there is not only no direct connection between the slats, but that there also exists no other connection by means of other extruded profiles.

ILLUSTRATION OF THE DRAWINGS

[0022] Further characteristics and advantages of the invention will become apparent from reading the following description of an embodiment of the invention provided by way of non-limiting example, with the aid of the figures illustrated in the appended tables of drawings, in which:

- Figure 1 represents a schematic and axonometric perspective view of a portion of the shutter according to the invention with the slats in the closed position;
- Figure 2 illustrates a schematic view in axonometric perspective similar to the previous one with the slats in the opening position, that is with the slats angularly oriented;
- Figure 3 is an exploded schematic view highlighting the components of the shutter according to the invention;
- Figures 4 to 9 represent, from different angles, pairs of components of a shutter according to the invention represented by slat holder elements associated with respective chain components for the kinematic connection;
- Figures 10 to 14 illustrate schematic and detailed views from different angles of a slat holder element according to the invention;
- Figures 15 to 19 are schematic views of a chain component and taken from different angles.

DESCRIPTION OF AN EMBODIMENT OF THE INVENTION

[0023] With reference to the attached figures, and initially in particular to Figure 3, the reference number 20 generally indicates a shutter as a whole comprising all the components thereof, the main of which are represented by a plurality of slats 21, hooked by ends thereof to a respective slat holder support 22, which is rotatably associated to a respective chain element 23, which chain element 23, together with further chain elements 23 consecutively connected to one another by the various slat holder supports 22, is inserted in a groove 24 formed on a vertical profile 25, positionable in the compartment of a window or a French window or another outward opening of a building.

[0024] More precisely, each slat 21 is made using an elongated and particularly shaped profiled element comprising a central through cavity made in such a way that the two ends of each slat allow accommodating respective slat holder elements 22 which perform the function of respective closing caps and of support for the lifting, lowering and orientation operations of the slats of the shutter itself, for a total of two mirror supports for each slat, which are fixed on the same ends in order to remain constrained thereto.

[0025] As represented in Figures 10 to 14, each slat holder support 22 is configured according to the same profile of each slat and comprises a shaped projection 26 designed to be introduced into the central through cavity when the slat holder is applied by joint-fitting on the end of the respective slat, in such a way as to form a single body with the same.

[0026] Furthermore, each slat holder 22 superiorly comprises two pins 27 and 28 that are parallel to one another and arranged on the opposite side to the slat holder with respect to the profiled projection 26.

[0027] In turn, each chain element 23, as represented in Figures 15 to 19, is made with a body also having a shape that resembles the one of the slat holder 22, and is provided, at the two opposite ends thereof, with two holes arranged parallel, indicated respectively with 29

and 30, of which the first is lower and the second is higher.

[0028] As represented in Figure 3, the lower hole 29 of each chain element 23 is destined to accommodate the upper pin 28 of the slat holder located on the lower slat, while the upper hole 30 accommodates the lower pin 27 of the slat holder located on the same level.

[0029] Each slat holder remains constrained to a pair of consecutive chain elements 23, with the possibility of angular rotation on the parallel axes of the pins 27 and 28, by screws 31 which are inserted passing through the holes in the pins 27 and 28 of the slat holders 22, to penetrate into channels 32 formed longitudinally in the profiled element of each slat 21 and to stably fix the same slat 21 to the respective slat holder 22. The head of each screw 31 effectively prevents each slat holder from slipping off the respective chain elements 23 to which it is coupled, i.e. the corresponding one and the one immediately above.

[0030] The lower part of the shutter comprises compensation elements represented by profiles 33, 34 arranged parallel with respect to the slats 21, which constitute the lower terminal part of the curtain, and by respective lateral closing elements 35, 36.

[0031] The profile 33 is free to slide vertically inside the profile 34 with a travel that defines the space in which the user of the shutter can halt the unwinding of the curtain and obtain an intermediate condition of the shutter fully lowered, but with the slats closed.

[0032] From an operational point of view, the chain elements 23 are exclusively connected by means of the pins 27 and 28 present on the slat holder 22 and, consequently, each slat holder connects two chain elements 23, i.e. one being its own chain and one being the chain located immediately above.

[0033] Furthermore the slats 21 are fixed only on the respective slat holders 22 from which they take the motion, consequently there is no direct connection between the slats themselves, or by means of other profiles.

[0034] The angular rotation of the slats, during the lowering of the shutter along the groove 24 of the profile 25 takes place because the upper pin 28 of each slat holder 22, located in the hole 29 of the immediately-superior chain 23, rotates about the axis of the hole 30 in which the pin 27 of the same slat holder is housed, setting all the slat holder and thus the respective slat in rotation.

[0035] According to the embodiment represented in Figures 1 and 2, this takes place when the shutter is fully lowered, and the compensation system constituted by the profiles 33 and 34 is fully compacted, due to the thrust of the force of gravity exerted by the weight of the upper part of the curtain on each upper pin 28 of each slat holder.

[0036] With reference to Figures 8 and 9, the pin 28 passes from a position overlying the position of the lower pin 27 (closed slats) to a position in which the upper pin is flanked to the lower pin 27 (oriented slats).

[0037] A too small width of the groove 24 could prevent all the travel of the pin 28 about the axis of the hole 30 causing an undesirable lower degree of orientation.

[0038] However, this condition does not occur in the present invention since the dimensions of the various components have been defined in such a way as to allow the travel of maximum orientation (which is in the order of 90°) in a width of the groove 24 which is the one of a standard shutter guide profile on the market.

[0039] The aforementioned compensation system, constituted by the profiles 33 and 34 which represent the lower terminal part of the curtain, and the respective lateral closing elements 35 and 36, has the function of allowing the user to easily identify the intermediate condition of the shutter in which the curtain is fully lowered, but all the slats are closed, that is not oriented. In fact, the profile 33 results to be inserted in the profile 34 and has the possibility of sliding therein in a telescopic manner in a vertical direction.

[0040] The travel of the profile 33 in the profile 34 defines the space in which the user of the shutter can halt the unwinding of the curtain and obtain the aforementioned intermediate condition. The further unwinding brings the profile 33 to rest on the bottom of the profile 34 with consequently unloading of the weight of the shutter on the threshold of the compartment in which it is placed with the effect that the force of gravity determined by the weight of the shutter is unloaded onto the pins 28 setting them in rotation about the axes of the holes 30 and of the pins 27 and by progressively causing all the slats to rotate.

[0041] The closure of the slats takes place when, by winding the curtain about the winding roller, the weight stops unloading on the pin 28 which, on the contrary, is brought by the force of gravity (this time of the lower part of the curtain) to assume again the initial position thereof above the pin 27.

[0042] The invention has been described in the foregoing with reference to a preferential embodiment thereof. However it is clear that the invention is susceptible to numerous variants which fall within the scope of the claims.

Claims

1. A roller shutter (20) comprising a plurality of slats (21), hooked by ends thereof to a respective slat holder support (22), which is rotatably associated to a respective chain element (23), which chain element (23), together with further chain elements (23) consecutively connected to one another, is inserted in a groove (24) formed on a vertical profile (25), positionable in the compartment of a window or a French window or another outward opening of a building, whereby said slat holder support (22) comprises a profiled projection (26) for joint-fitting to the respective slat (21), the shutter being **characterised in that** said slat holder support further superiorly comprises an upper pin (28) and a lower pin (27) that

are parallel to one another and arranged on the opposite side to the slat holder with respect to the profiled projection (26), and **in that** each chain element (23) is provided, at the two opposite ends thereof, with holes (29, 30) arranged parallel, of which a first is lower and a second is higher, and wherein the lower hole (29) of each chain element (23) is destined to accommodate the upper pin (28) of the slat holder located on the lower slat, while the upper hole (30) accommodates the lower pin (27) of the slat holder (22) located on the same level.

2. A roller shutter (20) according to claim 1, wherein each slat holder (22) comprises retaining means (31) which insert in respective holes provided in the upper and lower pins (27, 28) then to be introduced into channels (32) longitudinally formed in the profiled element of each slat (21) determining the retaining of the slat (21), slat holder (22) and chain (23) assembly on the same level and chain (23) corresponding to the adjacent upper slat, with a possibility of angular rotation between the slat holder (22) and chains (23).

3. A roller shutter (20) according to any one of the preceding claims, wherein said retaining means (31) which insert in respective holes provided in the upper and lower pins (27, 28) then to be introduced into channels (32) with which the slats (21) are provided, are constituted by self-tapping screws.

4. A roller shutter (20) according to to any one of the preceding claims, wherein said chain elements (23) are exclusively connected by means of the upper and lower pins (27, 28) present on the slat holder (22) and each slat holder (22) connects two chain elements (23), i.e. one being its own chain and the adjacent one being the chain located immediately above.

5. A roller shutter (20) according to to any one of the preceding claims, wherein said slats (21) are fixed on the respective slat holders (22) from which the slats (21) receive motion.

6. A roller shutter (20) according to to any one of the preceding claims, wherein there is not only no direct connection between the slats (21), but there also exists no other connection by means of other extruded profiles.

7. A roller shutter (20) according to to any one of the preceding claims, wherein the angular rotation of the slats during the lowering of the shutter takes place by force of gravity determined by the weight of the shutter which by unloading onto the upper pins (28) sets the pins in rotation about the axes of the holes (30) and the lower pins (27), progressively causing all the slats to rotate, as the upper pin (28) of each slat holder (22), located in the hole (29) of the immediately-superior chain (23), rotates about the axis of the hole (30) in which the lower pin (27) of the same slat holder (22) is housed, setting all the slat holder and thus the respective slat (21) in rotation.

8. A roller shutter (20) according to to any one of the preceding claims, wherein said upper pin (28), due to the angular rotation of the slats which occurs during the lowering of the shutter, passes from an initial position overlying the position of the lower pin (27) in which the slats are closed to a position in which the upper pin (28) is flanked to the lower pin (27) in which the slats are orientated.

9. A roller shutter (20) according to to any one of the preceding claims, wherein the lower part of the shutter comprises compensation elements represented by a first profile (33) and a second profile (34) arranged parallel with respect to the slats (21) and closed at ends thereof by caps (35, 36), whereby the compensation elements constitute the lower terminal part of the curtain.

10. A roller shutter (20) according to claim 9, wherein the travel of the first profile (33) in the second profile (34) defines the space in which the user of the shutter can halt the unwinding of the curtain and obtain an intermediate condition of the shutter fully lowered, but with the slats closed.

11. A roller shutter (20) according to to any one of the preceding claims, wherein the closing of the slats takes place when, by winding the curtain about the winding roller, the weight stops unloading on the upper pin (28) which, on the contrary, is brought by the force of gravity of the lower part of the curtain, to assume the initial position thereof above the lower pin (27).

Patentansprüche

1. Rollladen (20), umfassend eine Vielzahl von Latten (21), die durch Enden davon an einen jeweiligen Lattenhalterträger (22) eingehakt sind, der drehbar mit einem jeweiligen Kettenelement (23) assoziiert ist, wobei das Kettenelement (23), zusammen mit weiteren Kettenelementen (23), die konsekutiv miteinander verbunden sind, in eine Rille (24) eingesetzt ist, die an einem vertikalen Profil (25) gebildet ist, das in dem Abteil eines Fensters oder einer Fenstertür oder einer anderen Öffnung eines Gebäudes nach außen positionierbar ist, wodurch der genannte Lattenhalterträger (22) einen mit einem Profil versehenen Vorsprung (26) zum Zusammenfügen mit der jeweiligen Latte (21) umfasst, wobei der Rollladen

dadurch gekennzeichnet ist, dass der genannte Lattenhalterträger ferner darüber einen oberen Stift (28) und einen unteren Stift (27) umfasst, die parallel zueinander sind und auf der Seite gegenüber dem Lattenhalter in Bezug auf den mit dem Profil versehenen Vorsprung (26) angeordnet sind, und dadurch, dass jedes Kettenelement (23), an den zwei gegenüberliegenden Enden davon, mit parallel angeordneten Löchern (29, 30) versehen ist, von denen ein erstes tiefer und ein zweites höher liegt, und wobei das untere Loch (29) jedes Kettenelements (23) dazu bestimmt ist, den oberen Stift (28) des Lattenhalters aufzunehmen, der auf der unteren Latte angeordnet ist, während das obere Loch (30) den unteren Stift (27) des Lattenhalters (22) aufnimmt, der auf derselben Höhe angeordnet ist.

2. Rollladen (20) nach Anspruch 1, wobei jeder Lattenhalter (22) Haltemittel (31) umfasst, welche in jeweilige Löcher eingesetzt werden, die in den oberen und unteren Stiften (27, 28) bereitgestellt sind, um dann in Kanäle (32) eingeführt zu werden, die in Längsrichtung in dem mit dem Profil versehen Element jeder Latte (21) gebildet sind, und welche das Halten der Latte (21), des Lattenhalters (22) und der Kettenanordnung (23) auf derselben Höhe und der Kette (23) entsprechend der benachbarten oberen Latte bestimmen, mit einer Möglichkeit einer Winkeldrehung zwischen dem Lattenhalter (22) und den Ketten (23).

3. Rollladen (20) nach einem der vorhergehenden Ansprüche, wobei die genannten Haltemittel (31), welche in jeweilige Löcher eingesetzt werden, die in den oberen und unteren Stiften (27, 28) bereitgestellt sind, um dann in Kanäle (32) eingeführt zu werden, mit denen die Latten (21) versehen sind, aus Gewindeschneidschrauben bestehen.

4. Rollladen (20) nach einem der vorhergehenden Ansprüche, wobei die genannten Kettenelemente (23) ausschließlich mit Hilfe der oberen und unteren Stifte (27, 28) verbunden sind, die an dem Lattenhalter (22) vorhanden sind, und jeder Lattenhalter (22) zwei Kettenelemente (23) verbindet, d.h. wobei eines seine eigene Kette ist und das benachbarte die unmittelbar darüber angeordnete Kette ist.

5. Rollladen (20) nach einem der vorhergehenden Ansprüche, wobei die genannten Latten (21) an den jeweiligen Lattenhaltern (22) befestigt sind, von denen die Latten (21) eine Bewegung empfangen.

6. Rollladen (20) nach einem der vorhergehenden Ansprüche, wobei es nicht nur keine direkte Verbindung zwischen den Latten (21) gibt, sondern es auch keine andere Verbindung mit Hilfe anderer extrudierter Profile gibt.

7. Rollladen (20) nach einem der vorhergehenden Ansprüche, wobei die Winkeldrehung der Latten während des Herunterlassens des Rollladens durch Schwerkraft stattfindet, die durch das Gewicht des Rollladens bestimmt wird, das beim Entladen auf die oberen Stifte (28) die Stifte in Drehung um die Achse der Löcher (30) und der unteren Stifte (27) versetzt, wodurch progressiv bewirkt wird, dass sich alle Latten drehen, während sich der obere Stift (28) jedes Lattenhalters (22), der in dem Loch (29) der unmittelbar darüberliegenden Kette (23) angeordnet ist, um die Achse des Lochs (30) dreht, in dem der untere Stift (27) desselben Lattenhalters (22) aufgenommen ist, wodurch der gesamte Lattenhalter und somit die jeweilige Latte (21) in Drehung versetzt werden.

8. Rollladen (20) nach einem der vorhergehenden Ansprüche, wobei der genannte obere Stift (28), aufgrund der Winkeldrehung der Latten, die während des Herunterlassens des Rollladens auftritt, von einer anfänglichen Position, die über der Position des unteren Stifts (27) liegt, in welcher die Latten geschlossen sind, in eine Position übergeht, in welcher der obere Stift (28) von dem unteren Stift (27) flankiert wird, wobei die Latten ausgerichtet werden.

9. Rollladen (20) nach einem der vorhergehenden Ansprüche, wobei der untere Teil des Rollladens Kompensationselemente umfasst, welche von einem ersten Profil (33) und einem zweiten Profil (34) repräsentiert werden, die in Bezug auf die Latten (21) parallel angeordnet sind und an Enden davon durch Kappen (35, 36) verschlossen sind, wodurch die Kompensationselemente den untersten letzten Teil des Vorhangs darstellen.

10. Rollladen (20) nach Anspruch 9, wobei die Bewegung des ersten Profils (33) in dem zweiten Profil (34) den Raum definiert, in dem der Benutzer des Rollladens das Abrollen des Vorhangs anhalten kann und einen Zwischenzustand des vollständig heruntergelassenen Rollladens, jedoch mit geschlossenen Latten erhalten kann.

11. Rollladen (20) nach einem der vorhergehenden Ansprüche, wobei das Schließen der Latten stattfindet, wenn beim Aufrollen des Vorhangs um die Wickelrolle das Gewicht aufhört, sich auf den oberen Stift (28) abzuladen, der im Gegensatz dazu durch die Schwerkraft des unteren Teils des Vorhangs dazu gebracht wird, die anfängliche Position davon über dem unteren Stift (27) einzunehmen.

Revendications

1. Volet roulant (20) comprenant une pluralité de lames

(21), accrochées par leurs extrémités à un support porte-lame respectif (22), qui est associé à rotation à un élément de chaîne respectif (23), cet élément de chaîne (23), conjointement avec d'autres éléments de chaîne (23) reliés consécutivement les uns aux autres, étant inséré dans une rainure (24) formée sur un profil vertical (25), positionnable dans le compartiment d'une fenêtre ou d'une porte fenêtre ou d'une autre ouverture vers l'extérieur d'un bâtiment, ledit support porte-lame (22) comprenant une partie saillante profilée (26) pour un raccord articulé à la lame respective (21), le volet étant **caractérisé en ce que** ledit support porte-lame comprend en outre supérieurement une broche supérieure (28) et une broche inférieure (27) qui sont parallèles l'une à l'autre et disposées du côté opposé au porte-lame par rapport à la partie saillante profilée (26), et **en ce que** chaque élément de chaîne (23) comprend, à ses deux extrémités opposées, des orifices (29, 30) disposés de façon parallèle, dont le premier se trouve en position inférieure et le second en position supérieure, et dans lequel l'orifice inférieur (29) de chaque élément de chaîne (23) est destiné à recevoir la broche supérieure (28) du porte-lame situé sur la lame inférieure, tandis que l'orifice supérieur (30) reçoit la broche inférieure (27) du porte-lame (22) situé au même niveau.

2. Volet roulant (20) selon la revendication 1, dans lequel chaque porte-lame (22) comprend des moyens de rétention (31) qui viennent s'insérer dans des orifices respectifs prévus dans les broches supérieure et inférieure (27, 28) pour être ensuite introduits dans des canaux (32) formés longitudinalement dans l'élément profilé de chaque lame (21), déterminant la rétention de l'ensemble lame (21), porte-lame (22) et chaîne (23) au même niveau et de la chaîne (23) correspondant à la lame supérieure adjacente, avec la possibilité d'une rotation angulaire entre le porte-lame (22) et les chaînes (23).

3. Volet roulant (20) selon l'une quelconque des revendications précédentes, dans lequel lesdits moyens de rétention (31) qui viennent s'insérer dans les orifices respectifs prévus dans les broches supérieure et inférieure (27, 28) pour être ensuite introduits dans des canaux (32) dont sont pourvues les lames (21), consistent en des vis auto-taraudeuses.

4. Volet roulant (20) selon l'une quelconque des revendications précédentes, dans lequel lesdits éléments de chaîne (23) sont connectés exclusivement au moyen des broches supérieure et inférieure (27, 28) présentes sur le porte-lame (22) et chaque porte-lame (22) relie deux éléments de chaîne (23), c'est-à-dire l'un étant sa propre chaîne et l'élément adjacent étant la chaîne située immédiatement au-dessus.

5. Volet roulant (20) selon l'une quelconque des revendications précédentes, dans lequel lesdites lames (21) sont fixées sur les porte-lame respectifs (22) à partir desquels les lames (21) reçoivent un mouvement.

6. Volet roulant (20) selon l'une quelconque des revendications précédentes, dans lequel non seulement il n'y a pas de liaison directe entre les lames (21), mais il n'existe également pas d'autre liaison au moyen d'autres profils extrudés.

7. Volet roulant (20) selon l'une quelconque des revendications précédentes, dans lequel la rotation angulaire des lames pendant la descente du volet s'effectue par une force de gravité déterminée par le poids du volet qui, en se déchargeant sur les broches supérieures (28), met les broches en rotation autour des axes des orifices (30) et des broches inférieures (27), provoquant progressivement la rotation de toutes les lames, tandis que la broche supérieure (28) de chaque porte-lame (22), située dans l'orifice (29) de la chaîne (23) immédiatement supérieure, tourne autour de l'axe de l'orifice (30) dans lequel la broche inférieure (27) du même porte-lame (22) est logée, mettant en rotation tous les porte-lame et ainsi la lame respective (21).

8. Volet roulant (20) selon l'une quelconque des revendications précédentes, dans lequel ladite broche supérieure (28), du fait de la rotation angulaire des lames qui se produit pendant la descente du volet, passe d'une position initiale surplombant la position de la broche inférieure (27) dans laquelle les lames sont fermées à une position dans laquelle la broche supérieure (28) se trouve à côté de la broche inférieure (27), dans laquelle les lames sont orientées.

9. Volet roulant (20) selon l'une quelconque des revendications précédentes, dans lequel la partie inférieure du volet comprend des éléments de compensation représentés par un premier profil (33) et un second profil (34) disposé parallèlement aux lames (21) et fermé à ses extrémités par des embouts (35, 36), les éléments de compensation formant la partie terminale inférieure du rideau.

10. Volet roulant (20) selon la revendication 9, dans lequel le trajet du premier profil (33) dans le second profil (34) définit l'espace dans lequel l'utilisateur du volet peut interrompre le déroulement du rideau et obtenir un état intermédiaire du volet complètement abaissé, mais avec les lames fermées.

11. Volet roulant (20) selon l'une quelconque des revendications précédentes, dans lequel la fermeture des lames se produit quand, par l'enroulement du rideau autour du rouleau d'enroulement, le poids cesse de

se décharger sur la broche supérieure (28) qui, au contraire, est entraînée par la force de gravité de la partie inférieure du rideau, pour reprendre sa position initiale au-dessus de la broche inférieure (27).

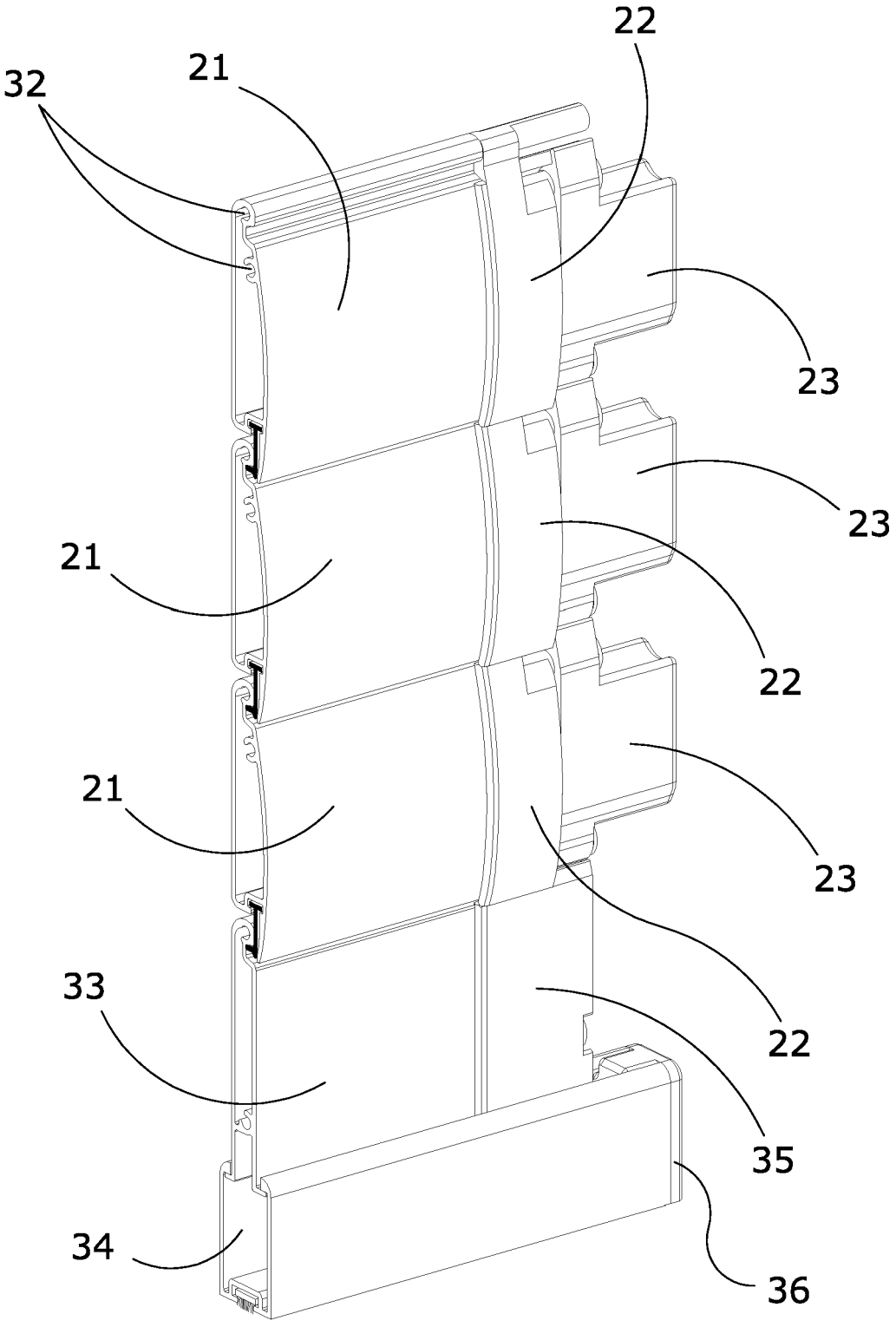

Fig. 1

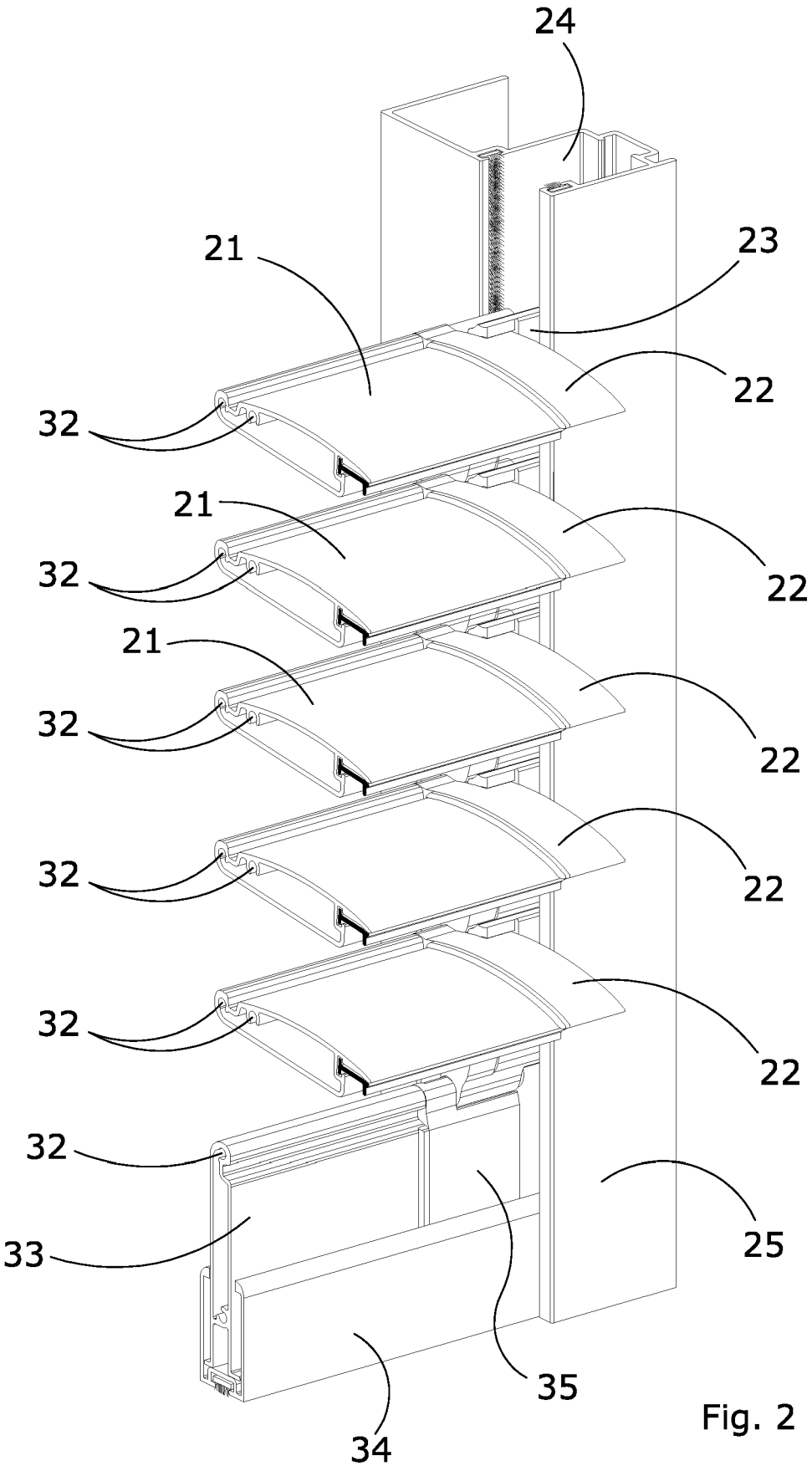

Fig. 2

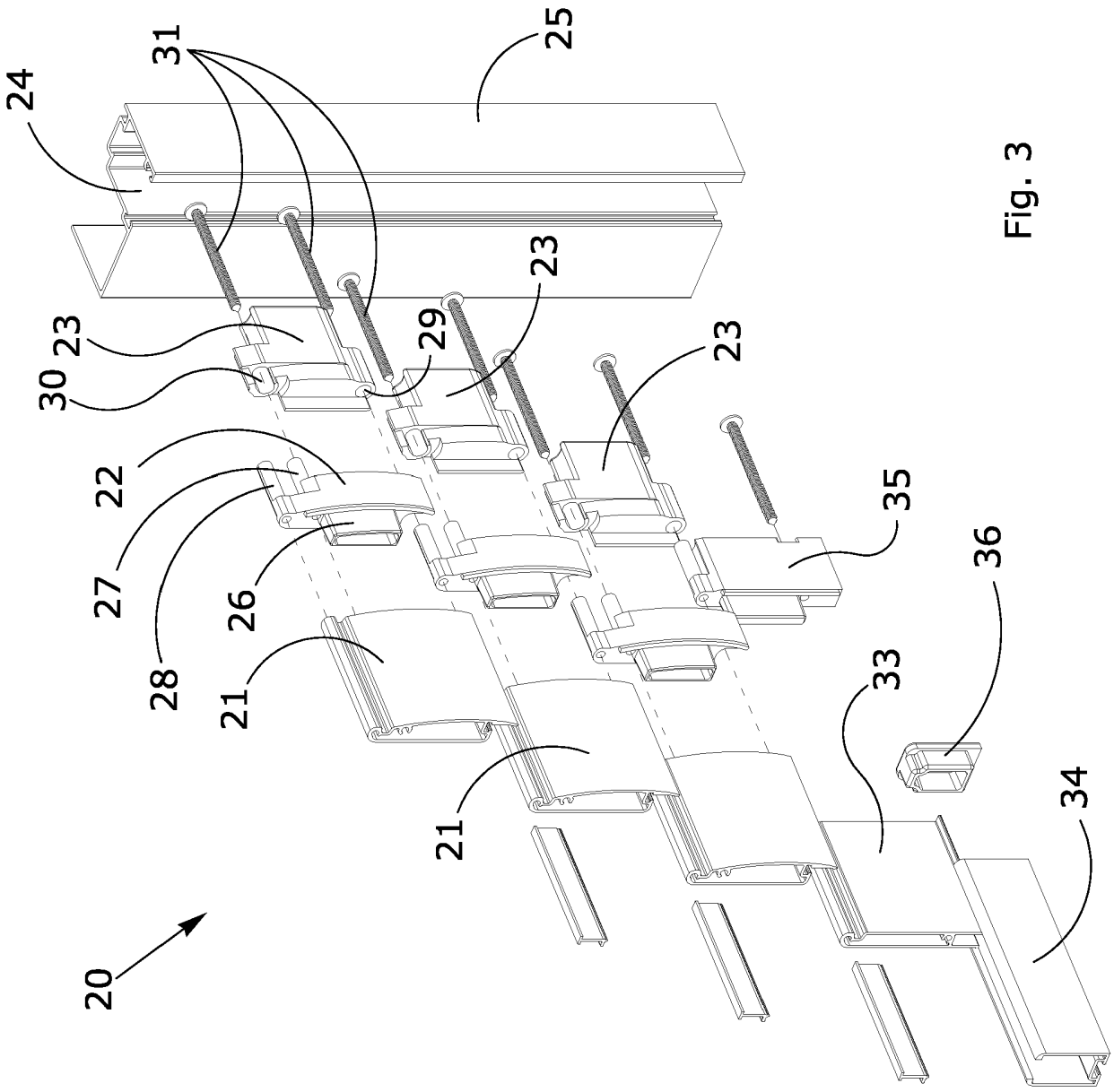

Fig. 3

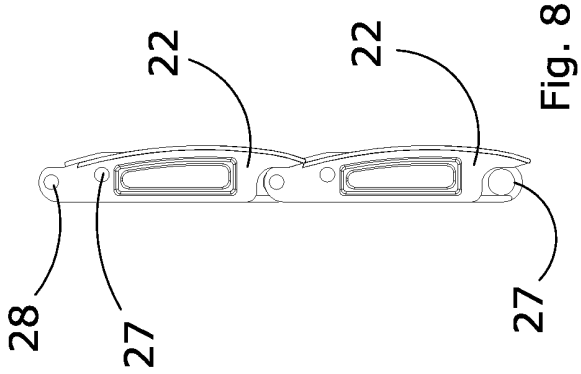

Fig. 8

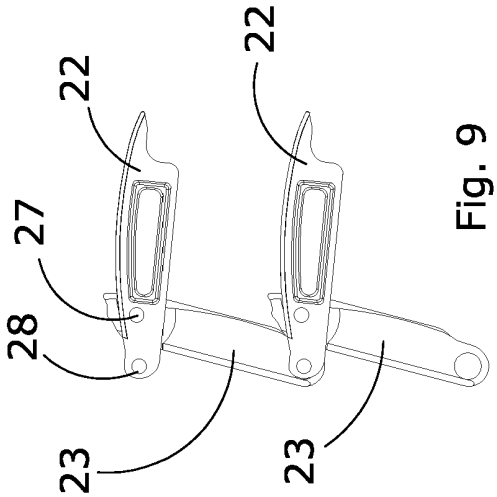

Fig. 9

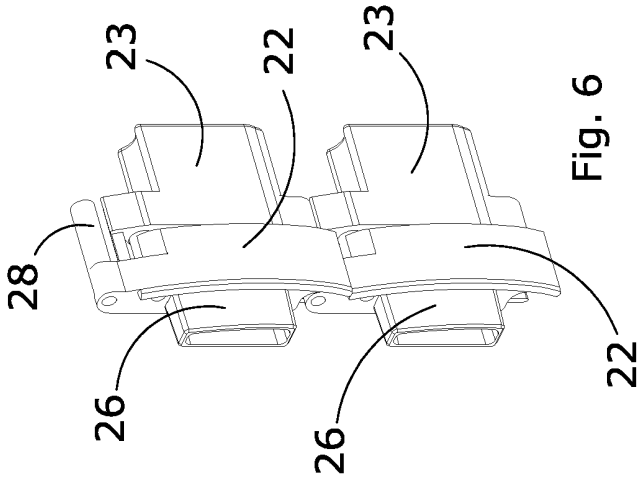

Fig. 6

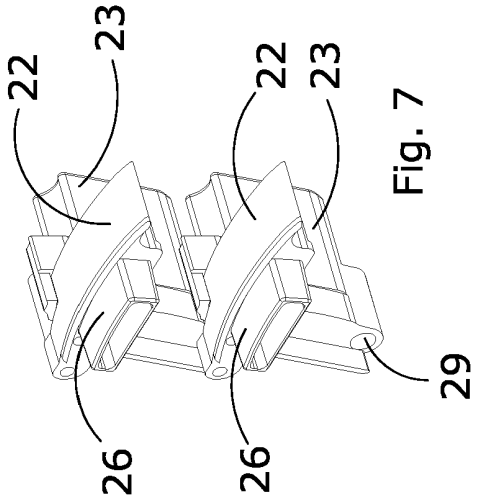

Fig. 7

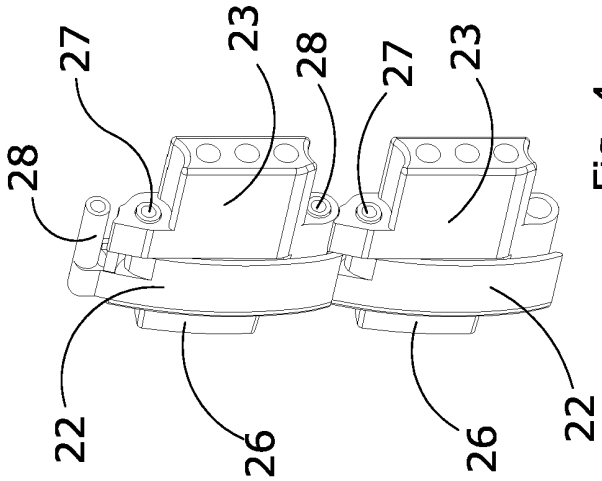

Fig. 4

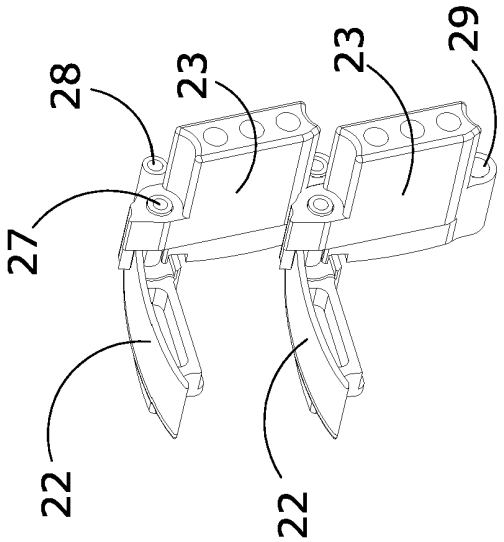

Fig. 5

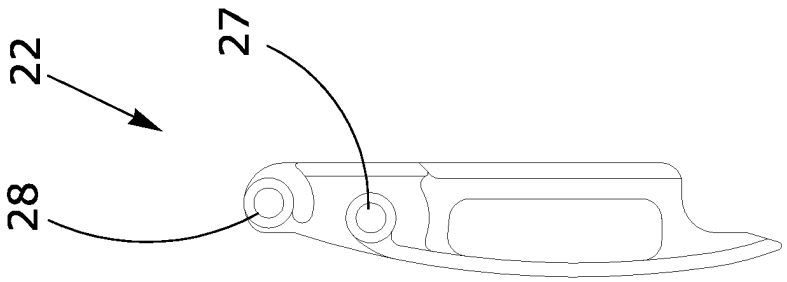

Fig. 14

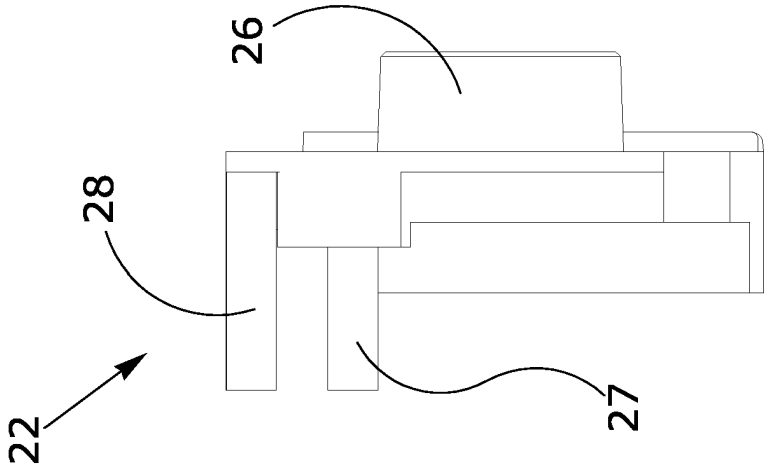

Fig. 13

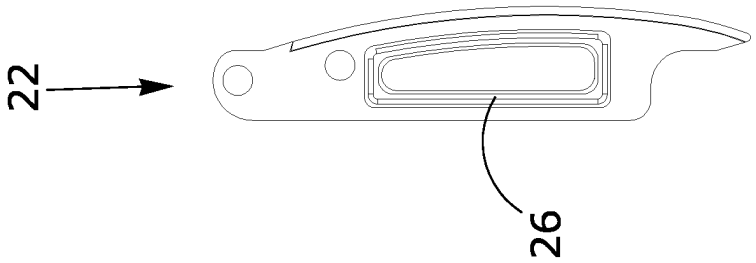

Fig. 12

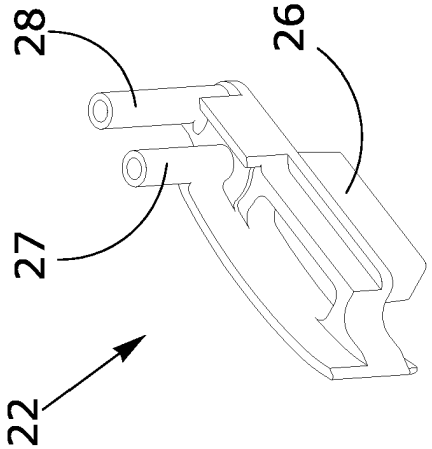

Fig. 10

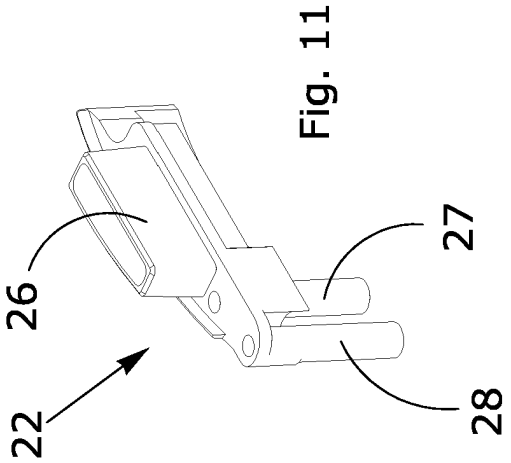

Fig. 11

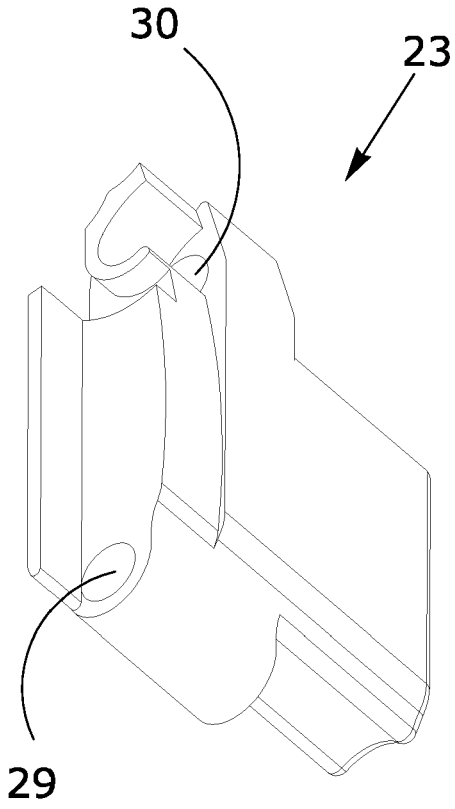

Fig. 15

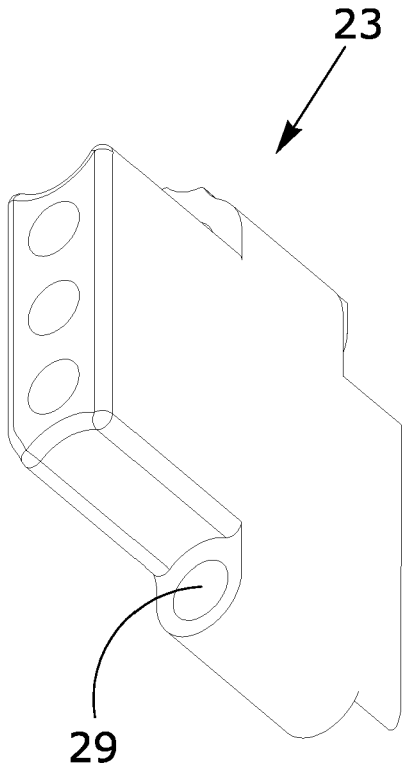

Fig. 16

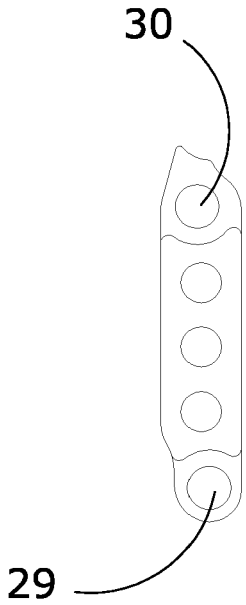

Fig. 17

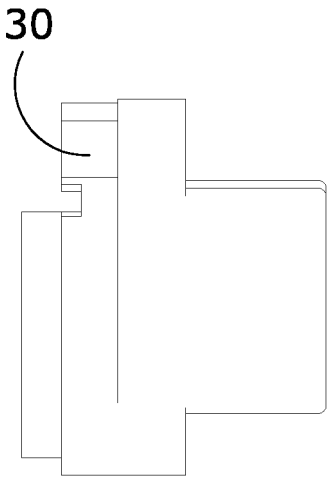

Fig. 18

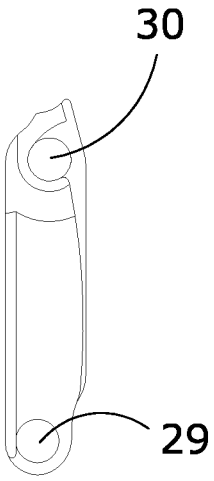

Fig. 19

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 2398993 A **[0006]**
- EP 2722475 A **[0008]**
- EP 3221544 A **[0011]**
- EP 915227 A **[0012]**
- WO 2016166694 A **[0013]**
- EP 382172 A **[0013]**