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The references to the drawing(s) no. 21 and 22 are deemed to be deleted (Rule 56(4) EPC).

(54) ROLLER SHUTTER WITH ADJUSTABLE SPACING SLATS

(57) Roller shutter with spaceable slats, comprising a plurality of slats (11, 12, 13) configured to slide between two side guides (5) positioned at the sides of a building window, characterized in that each one of said slats (11, 12, 13) comprises an upper through slotted hole (112, 122, 132) and a lower through slotted hole (111, 121, 131), in that to each slat (11, 12, 13) a lower through pin (80) is associated, which is introduced inside said lower through slotted hole (111, 121, 131), and an upper through pin (81) is associated, which is introduced inside said upper through slotted hole (112, 122, 132), the dimensions of said pins (80, 81) being such that a transition fit is allowed inside the respective through slotted hole (112, 111, 122, 121, 132, 131), so that each pin (80, 81) can slide vertically with respect to respective slat (11, 12, 13), and in that each lower through pin (80) associated to a slat (11) is fastened to the upper through pin (81) of the lower slat (12) so that said pins remain parallel and at constant distance between each other during the roller shutter functioning.

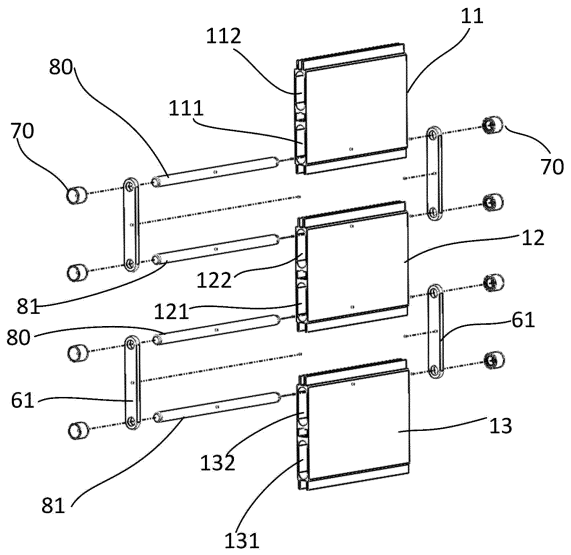

Fig.1

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Description

[0001] The present invention relates to a roller shutter with variable spacing slats.

Technical field

[0002] At the state of the art there are known various embodiments of roller shutters to block out light, mounted outside glass windows and configured to be wound up around an axis or "roller" arranged inside a box positioned in the upper portion of the window.

[0003] According to traditional embodiments, roller shutters are made up of a plurality of slats parallel between each other, fastened to each other so that they can respectively rotate; so, the slats can be wound up around a roller in the box. However, only a total blackout effect is obtained in this way from the roller shutter, since the distance between two parallel slats is constant, and in particular is such that no light passes therebetween. For this reason, a series of technical solutions have been developed which allow to space out the slats when the roller shutter is lowered, so that both the blackout screen function and the solar screen and wind screen function are obtained by means of the roller shutter.

[0004] A first solution known at the state of the art is described in the Italian application BA2013A000002, where a roller shutter is shown in which slats are fastened to each other by means of ovoid flanges comprising a slotted hole and fastened to clamping screws rigidly fastened to the slat profile. Another example is described in the Spanish application ES2335372, in which a substantially similar system is shown. A different mechanism is shown in the Italian Patent 1394469 in which a roller shutter is described, whose slats are fastened to a mechanism of articulated rods which allows the relative distance between the slats to be varied. Another example is shown in the European Patent EP3184726, in which it is shown a roller shutter to block out windows, comprising a plurality of slats with slotted holes in their profile and fastened to each other by means of "U" shaped hooks, kept in position by a plug which allows the hooks to slide and rotate with respect to the slats. Many other embodiments of roller shutter with spaceable slats are known at the state of the art.

[0005] While realizing a roller shutter with spaceable slats, the problem exists to avoid that the roller shutter can be lifted from outside. To such aim, some technical solutions have been proposed.

[0006] A first solution is shown in the Italian Patent application BA2012A000023 in which it is described a roller shutter with spaceable slats, connected by means of sliding hooks provided with a hole and a semicircular slot and configured so that, in case of bottom-up thrust of the slat the hook is connected to, the upper end of the hook is moved from the sliding vertical axis and engages metal blocks fastened to the side guides of the roller shutter.

[0007] Another technical solution is described in EP1728965A2, in which a roller shutter is described, in which hooks are introduced among the slats, which hooks are provided with a hole through which a pin fastens them to the lower slat, and with a slot through which a pin fastens them to the upper slat. The hook kinematism is such that when the roller shutter is lifted by actuating the upper roller which it is wound up on, the hooks go up vertically, vice versa when the roller shutter is lifted bottom-up, for example forced by a burglar, the hooks tip is moved from its own vertical sliding axis and engages blocks obtained in the sliding guides, thus avoiding that the roller shutter is lifted.

[0008] Anyway, these and other devices known at the state of the art are limited, since they need the installation of blocks or any other fastening means in the guides where the roller shutter slides, their functioning is noisy and they can damage the side guides upon roller shutter forcing.

[0009] Moreover, in some cases the fastening system of the various slats of the roller shutter has winding up problems inside the box, in other cases it is not mechanically robust and can be subjected to deformation of its elements, as it occurs for example in case of undesired stresses in systems using "U" or "C" shaped hooks.

[0010] Therefore, aim of the present invention is to provide a roller shutter with spaceable slats, which overcomes the limits of the systems known at the state of the art, which is mechanically robust and cheap in its realization.

[0011] According to another aim, the present invention provides an anti-lifting device for roller shutters with spaceable slats, which overcomes the limits linked of the embodiments known at the state of the art, and which, in particular, can be mounted without the need to provide holes or to introduce stops of any kind in the roller shutter guides, whose functioning is noiseless, which is cheap in its realization and which does not damage the roller shutter guides upon an attempt of burglary.

[0012] Figure 1 shows an exploded view of a preferred embodiment of the roller shutter with spaceable slats according to the invention, shown assembled in figure 2, in the configuration with spaced slats. Figure 3 shows a section view of a preferred embodiment of the slat to be used with the roller shutter according to the invention; figures 4, 5 and 6 show jointing plates, the jointing pin and the seal, respectively. Figures 7, 8 and 9 show the roller shutter according to the invention in closed configuration, in configuration with spaced slats and in wound up configuration.

[0013] Figures 10 and 11 show two axonometric views of the roller shutter assembled inside the side guides, figure 12 shows a top section view of the assembled roller shutter.

[0014] Figure 13 shows an exploded view of a second preferred embodiment of the roller shutter with spaceable slats according to the invention, comprising anti-lifting means, shown assembled in figure 14. Figures 15, 16 and 17 show the three configurations each anti-lifting

blocking means can take; figures 18 and 19 show this second embodiment in top section view; figures 20, 21 and 22 show an alternative embodiment of a roller shutter comprising the anti-lifting means according to the invention.

[0015] With reference to the appended figure 1, in which it is shown an exploded view of a preferred embodiment of the device, the roller shutter according to the invention comprises a plurality of slats (11, 12, 13) each one provided with two through slotted holes (112, 111, 122, 121, 132, 131). So, each slat comprises an upper through slotted hole (112, 122, 132) and a lower through slotted hole (111, 121, 131).

[0016] Inside each one of said slotted holes a through pin (80, 81) is introduced, whose diameter is such that it allows a transition fit inside said through slotted holes (112, 111, 122, 121, 132, 131). In this way, each pin (80, 81) can slide vertically with respect to its respective slat (11, 12, 13) but it cannot go out therefrom laterally for reasons explained in the following.

[0017] From the analysis of the drawings and following description, in which it is specified that the fastening of each pin couples occurs preferably by blocking them from opposite sides of the roller shutter by means of rigid plates, it is clear that the word "through" means that each pin (80, 81) is longer than the slat (11, 12, 13), so that it can be introduced inside the same and can project from both sides.

[0018] So, to each slat (11, 12, 13) a lower through pin (80) is associated, which is introduced in the lower through slotted hole (111, 121, 131), and an upper through pin (81) is associated, which is introduced inside the upper through slotted hole (112, 122, 132).

[0019] So, each lower through pin (80) associated to a slat (11) is fastened with the upper through pin (81) of the lower slat (12).

[0020] Similarly, each upper through hole (81) associated to a slat (13) is so fastened to a lower through pin (80) of the upper slat (12) so that said first pins (80, 81) remain parallel and at constant distance between each other during the roller shutter functioning. Preferably, in order to maximize the possibility of the slats respective spacing, such distance is such that when two consecutive slats rest upon each other, the upper pin (81) of the lower slat (12) is positioned on the bottom of the respective upper through slotted hole (122), and the lower through pin (80) of the upper slat (11) is positioned on the top of the respective lower through slotted hole (111).

[0021] In other terms, when two consecutive slats rest upon each other, the through pins fastening them come closer to the centre of the slat where they are introduced, while when two consecutive slats are spaced with respect to each other, the through pins fastening them move away from the centre of the slat where they are introduced.

[0022] In the preferred embodiment shown in the drawings, the fastening of each pin couple occurs by means of a couple of rigid plates (61), each one arranged for each side of respective slats and provided with through holes (611) inside which the ends of the through pins (80, 81) pass, which are then blocked by a seal (70).

[0023] Preferably, the ends (801) of the through pins (80, 81) are threaded, and the coupling with the seals (70) occurs by screwing the seals (70).

[0024] It is to be specified that, since the through pin can rotate inside the respective slotted hole, the coupling with the plate can be both of fixed kind (i.e. the plate cannot rotate with respect to the through pin) and mobile kind (i.e. the plate can rotate with respect to the through pin), without compromising the roller shutter functioning.

[0025] In another embodiment, the holes (611) of the plates and the ends of the pins can have fixing shapes, also by means of snap hooks or the like known at the state of the art, so that there is no need of seals (70).

[0026] So, it is obtained that all the slats are fastened to each other so that their respective distance is variable, and in particular, it increases while the roller shutter is lifted.

[0027] In lifting step, starting from the position shown in figure 7, the upper slat (11) is lifted, and its lower through pin (80) remains still up to when the end portion of the lower through slotted hole (111) of the slats (11) starts lifting it.

[0028] Since the distance with respect to the upper pin (81) of the next slat (12) is fixed, this one starts to be lifted by the previous pin (80), but it cannot lift in turn the lower slat (12) up to when it is arrived on the top of the respective slotted hole (122).

[0029] At this point, the lower slat (12) starts lifting and the mechanism is repeated identically with the next slat (13).

[0030] When the whole roller shutter is lifted, it is obtained the configuration of the wound up roller shutter shown in figure 9.

[0031] It is clear that the roller shutter slides inside the side guides (5), and that it is wound up around a roller, possibly motorized, inside a box (not shown in the appended drawings) positioned on the top of the window. These are the elements known at the state of the art which can be realized, together with the roller shutter according to the invention, without departing from the aims of the invention.

[0032] Similarly, minor variations of the just described slats and shown in the drawings (such as for example the addition of rubber gaskets or slight section variations) can be provided without departing from the aims of the invention.

[0033] It is be noted that the pins (80, 81) and respective plates (61), once assembled, become a rigid ring fastening two slats consecutive to each other.

[0034] It is now described a preferred embodiment of the invention, provided with an anti-lifting device.

[0035] As it is shown in figure 13, the roller shutter can comprise further a plurality of deformable stopping elements (21, 22, 23), positioned laterally from both sides with respect to at least one of said slats (11, 12, 13).

[0036] Preferably, said deformable stopping elements (21, 22, 23) are positioned laterally from both sides with respect to a plurality of roller shutter slats.

[0037] Each one of said deformable stopping elements (21, 22, 23) is fastened in its central portion to the slat it is associated to (11, 12, 13), in the upper end to the upper through pin (81) of the slat it is associated to and in lower end to the lower through pin (81) of the slat it is associated to.

[0038] So, said deformable elements are configured so that the respective sliding of the through pins (80, 81) causes a thickness variation thereof, and in particular, so that the end of the deformable element coming closer to the centre of the slat due to the adjacent slat coming closer causes an increase in thickness of the same deformable element.

[0039] Said deformable stopping elements are positioned so that they slide inside the side guides (5) between which the roller shutter slides, and are configured to prevent the roller shutter from being lifted, in case the thrust comes from a lower slat towards an upper slat (as it occurs in case of attempt of burglary), and are configured instead to allow the roller shutter to be lifted in case the thrust is transmitted by an upper slat to a lower slat (as it occurs during the normal roller shutter functioning, when the lifting occurs by means of the roller rotation starting from the upper slat). As it is explained in the following, the deformable stopping elements are configured to vary their own thickness as a function of the respective distance between two consecutive slats, and in particular so that their thickness is increased when two consecutive slats are next to each other. The increase in thickness causes the deformable stopping element to be compressed against the inner walls of the side guides (5), and so it hinders the roller shutter sliding by friction.

[0040] In particular, to each slat (11, 12, 13) two respective deformable stopping elements (21, 22, 23) are associated, one for each side.

[0041] With reference to figure 15, in which a view of the deformable stopping element (22) is shown, in a preferred embodiment it comprises:

- in its own central portion a fastening means (221) configured to be fastened integrally to the centre of the slat (12), the deformable element (22) is associated to;
- an upper portion (222) configured to come closer to the centre when the upper slat is lowered;
- a lower portion (223) configured to come closer to the centre when the slat (12), the deformable element (22) is associated to, comes closer to the lower slat.

[0042] Figures 15, 16 and 17 show respectively the shape of the deformable element (22) associated to a central slat (12): when the three slats (11, 12, 13) are spaced to each other; when the central slat (12) is lowered on the lower slat (13), while the upper slat (11) is still spaced; when the three slats are all closer to each other.

[0043] So, the upper portion (222) is configured so that the lower slat (13) coming closer to or moving away from the slat (12), the deformable element (22) is associated to, causes a contraction or expansion thereof along the roller shutter sliding direction, and at the same time, a thickening or thinning along the direction orthogonal to the roller shutter plane.

[0044] Figure 17, as yet said, shows the shape of the deformable element (22) when the slats (11, 13) adjacent to the slat (12), the element is associated to, are completely next to this latter one.

[0045] This configuration is taken when the roller shutter is completely lowered or when the lower slat (13) is lifted - for example in case of attempt of burglary - and abuts against the upper slat (12), which in turn abuts against the upper slat (11) thereto.

[0046] As it is shown in figure 15, in a preferred embodiment said deformable element comprises in the upper portion (222) a suitable fastening means (222-a) configured to be fastened to the upper pin (81) introduced in the upper slotted hole (122) of the slat (12), the deformable element is associated to. This fastening means can consist of a through eyelet (222-a) configured to house the upper through hole (81). Similarly, said deformable element (22) comprises in the lower portion (223) a suitable fastening means configured to be fastened to the lower pin (80) introduced in the lower slotter hole (121) of the slat (12), the deformable element is associated to. This fastening means can consist of a through eyelet (223-a) configured to house the lower through pin (80).

[0047] Finally, after explaining the movement of the through pins (80, 81) during the roller shutter functioning, it is to be said that when two consecutive slats rest upon each other, the through pins fastening them come closer to the centre of the slat where they are introduced, thus deforming the portions of deformable elements associated thereto by means of respective fastening means, by expanding their thickness.

[0048] Similarly, when two consecutive slats are spaced with respect to each other, the through pins fastening them move away from the centre of the slat where they are introduced, thus bringing the portions of deformable elements associated thereto by means of respective fastening means back in their own expanded configuration, shown in figure 15.

[0049] With reference to figure 18, when the slats are spaced with respect to each other, inside the guide (5) the deformable element (22) is in transition fit, and so it can slide freely.

[0050] When, instead, the slats are close to each other, as it is shown in figure 19, the deformable element (22) is in configuration of figure 17, and so, it is compressed inside the sliding guides (5) of the roller shutter, thus exerting a braking action by friction which prevents the roller shutter from sliding.

[0051] So, in case the roller shutter is lifted from the

bottom (attempt of burglary), the first slats coming closer at the bottom of the roller shutter deform the respective stopping means (22) which prevent the roller shutter from being further lifted by friction.

[0052] Preferably but not limitingly, the deformable element (2) is provided with areas (24) with increased adherence in the portions which would slide against the side guide (5) in case of roller shutter lifting with bottom-up thrust, and so with closer slats.

[0053] Said areas (224) are those ones exposed on the top and laterally when the deformable stopping means is in its deformed configuration, shown in figure 17. Preferably, the deformable stopping means is realized in rubber or polymers with suitable elastic features. The adherence improvement, i.e. the increase in coefficient of friction, can be obtained by surface treatment, by acting on the roughness of the mold, by introducing inserts of different materials or by other techniques known at the state of the art. It is to be specified further that the deformations shown for the deformable element are elastic, and that preferably the deformable element is realized in elastomeric material, such as for example natural or synthetic rubber.

[0054] Another embodiment of the roller shutter according to the invention, in which the deformable elastic means (22) are used together with various fastening means is shown in figure 20. In this embodiment, the fastening of a slat to the next one occurs by means of "U" shaped hooks (31, 32), whose ends are introduced in slotted holes (112, 111, 122, 121, 132, 131) provided in the profile of the roller shutter slats.

[0055] In this way, when the upper slat (11) is lifted upwards (by means of rotation of the roller around which the roller shutter is wound up, not shown in figure), it exerts its own towing action on the lower slat (12) only when the respective distance between the slats reaches the maximum distance allowed by the "U" shaped hooks (31). So, the various hooks (31, 32) can slide and rotate with respect to the slats, but they cannot be removed since they are kept in position by respective plugs (41, 42, 43). Other fastening modes relating to the slats are possible without departing from the aims of the invention.

[0056] With reference to the embodiment shown in figure 20, to the first portion (or lower portion) (222) of the deformable element (22) an end (321) of a "U" shaped hook (32) is fastened, whose other end slides inside a respective slotted hole (132) provided on the lower slat (13). Similarly, to the second portion (or upper portion) (223) of the deformable element (22) an end (311) of a "U" shaped hook (31) is fastened, whose other end slides inside a respective slotted hole (111) provided on the upper slat (11). So, it is clear that the "U" shaped hooks (31, 32), as a function of the respective distance between the slats, determine the configuration taken by the deformable stopping element (22), which exerts its own braking action by friction as a function of the configuration taken according to what yet explained.

[0057] Other respective fastening means between the slats are also possible, among the ones known at the state of the art, by suitably changing the geometry of the deformable elements (21, 22, 23) to allow coupling so that the thickness of deformable elements increases when adjacent slats are next to each other and decreases when adjacent slats are spaced to each other.

Claims

1. Roller shutter with spaceable slats, comprising a plurality of slats (11, 12, 13) configured to slide between two side guides (5) positioned at the sides of a building window,
characterized in that

   each one of said slats (11, 12, 13) comprises an upper through slotted hole (112, 122, 132) and a lower through slotted hole (111, 121, 131),
   in that
   to each slat (11, 12, 13) a lower through pin (80) is associated, which is introduced inside said lower through slotted hole (111, 121, 131), and an upper through pin (81) is associated, which is introduced inside said upper through slotted hole (112, 122, 132), the dimensions of said pins (80, 81) being such that a transition fit is allowed inside the respective through slotted hole (112, 111, 122, 121, 132, 131), so that each pin (80, 81) can slide vertically with respect to respective slat (11, 12, 13), and said pins (80, 81) being longer than the slat (11, 12, 13) they are associated to, so that the same project from both sides of said slat (11, 12, 13) when they are introduced inside respective through slotted holes (111, 121, 131, 112, 122, 132),
   in that
   each lower through pin (80) associated to a slat (11) is fastened to the upper through pin (81) of the lower slat (12) so that said pins remain parallel and at constant distance between each other during the roller shutter functioning.

2. Roller shutter with spaceable slats according to claim 1, **characterized in that** said distance is such that when two consecutive slats rest upon each other, said upper pin (81) is positioned on the bottom of the respective upper through slotted hole (122), and said lower through pin (80) is positioned on the top of the respective lower through slotted hole (111).

3. Roller shutter with spaceable slats according to claim 1 o 2, **characterized in that** the fastening of each couple of pins (80, 81) occurs by means of a couple of rigid plates (61), each one arranged for each side of the slats of said roller shutter and provided with through holes (611) inside which the ends of said through pins (80, 81) pass, which are then blocked

by a seal (70).

4. Roller shutter with spaceable slats according to claim 3, **characterized in that** said lower through pin (80), said upper through pin (81) and respective connecting plates (61), once assembled, constitute a rigid ring fastening two slats consecutive to each other.

5. Roller shutter with spaceable slats according to any one of the preceding claims, comprising further a plurality of deformable stopping elements (21, 22, 23), positioned laterally from both sides with respect to at least one of said slats (11, 12, 13), each one of said deformable stopping elements (21, 22, 23) being fastened:

- in its central portion to the slat it is associated to (11, 12, 13),
- in the upper end to said upper through pin (81) associated to said at least one slat,
- in the lower end to the lower through pin (81) associated to said at least one slat,

said deformable elements being configured so that the respective sliding of said through pins (80, 81) causes a thickness variation thereof.

6. Roller shutter with spaceable slats according to claim 5, **characterized in that** the end of the deformable element coming closer to the centre of the slat due to the adjacent slat coming closer causes an increase in thickness of the same deformable element.

7. Roller shutter with spaceable slats according to claim 5 or 6, **characterized in that** said deformable stopping elements (21, 22, 23) are configured to vary their own thickness as a function of the respective distance between two consecutive slats, and in particular so that their thickness is increased when two consecutive slats are next to each other, so that each deformable stopping element is compressed against the inner walls of the side guides (5), and hinders the roller shutter sliding by friction.

8. Roller shutter with spaceable slats according to claim 6 or 7, **characterized in that** each deformable stopping element (22) comprises:

- a central fastening means (221) configured to be fastened integrally to the centre of the slat (12), the deformable element (22) is associated to;
- an upper portion (222) configured to come closer to the centre when the upper slat is lowered;
- a lower portion (223) configured to come closer to the centre when the slat (12), the deformable element (22) is associated to, comes closer to the lower slat.

9. Roller shutter with spaceable slats according to claim 8, **characterized in that** each deformable stopping element comprises

- in the upper portion (222) a suitable fastening means (222-a) configured to be fastened to the upper pin (81) introduced in the upper slotted hole (122) of the slat (12), the deformable element is associated to;
- in the lower portion (223) a suitable fastening means configured to be fastened to the lower pin (80) introduced in the lower slotter hole (121) of the slat (12), the deformable element is associated to.

10. Roller shutter with spaceable slats according to any one of claims 5 to 9, **characterized in that** said deformable elements (2) are provided with areas (24) with increased adherence, positioned at the portions which would slide against the side guide (5) in case of roller shutter lifting with bottom-up thrust.

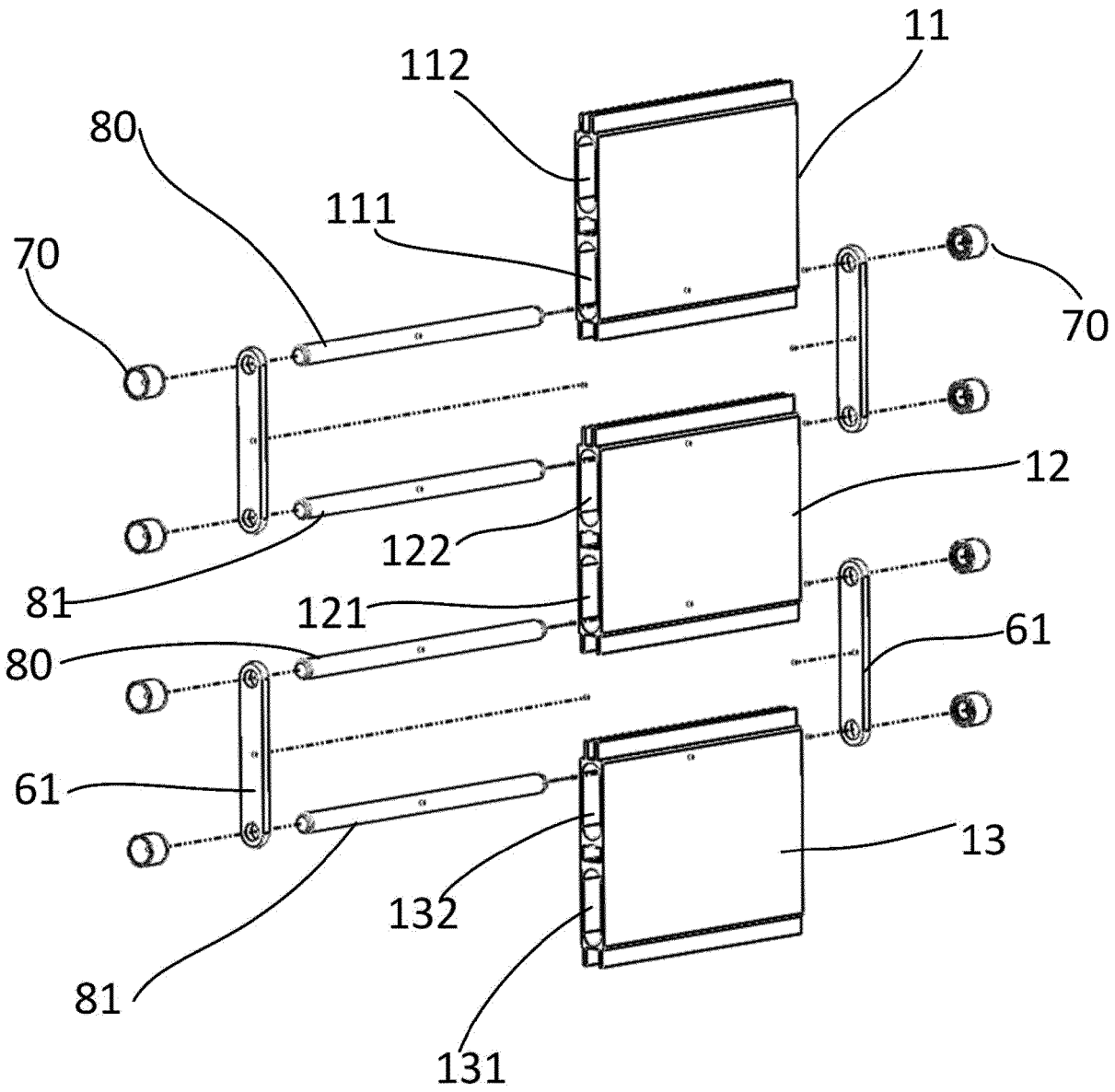

Fig.1

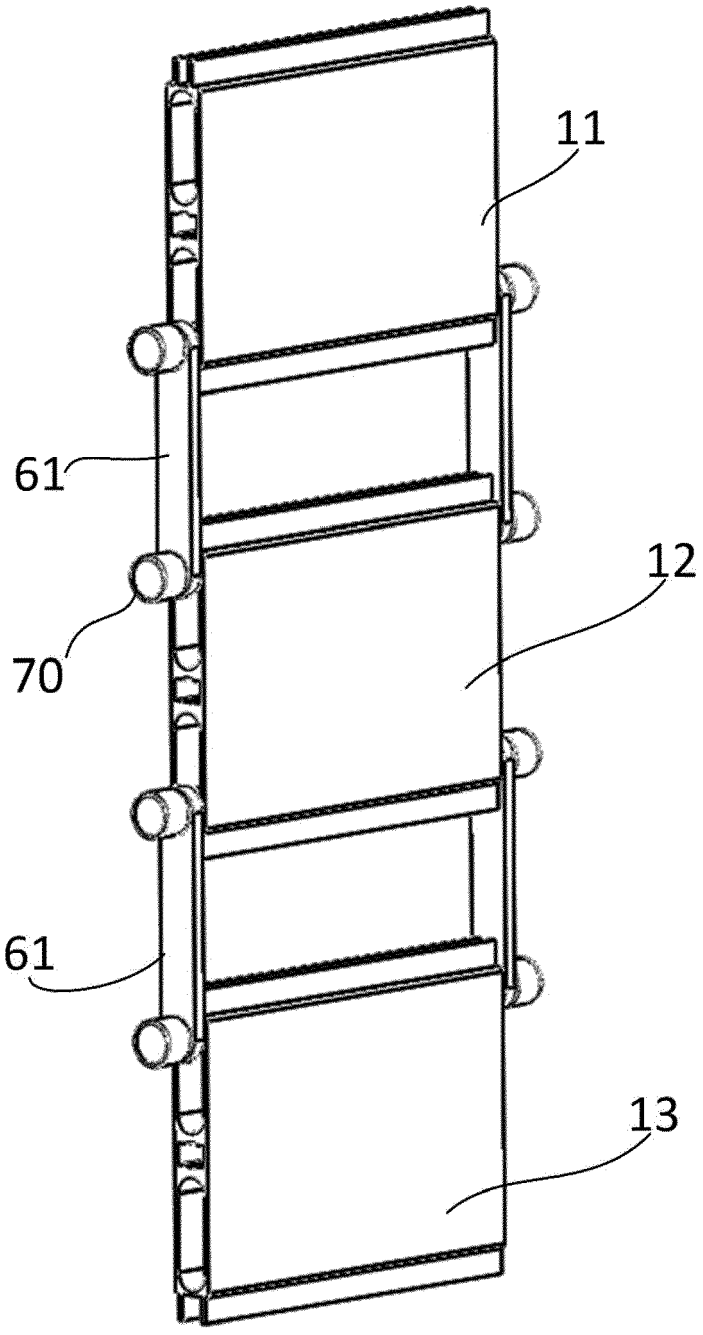

Fig.2

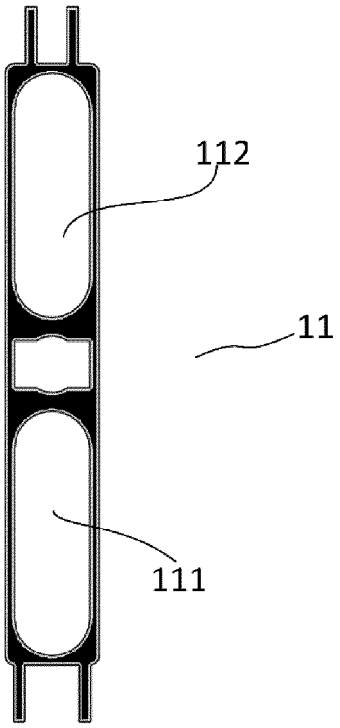

Fig. 3

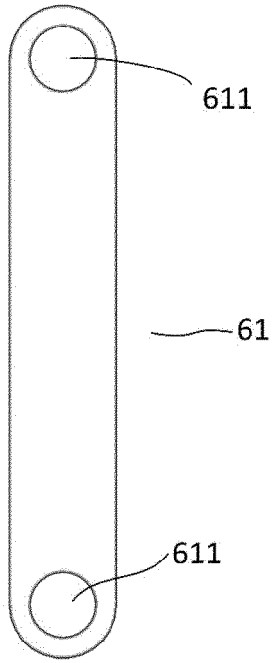

Fig. 4

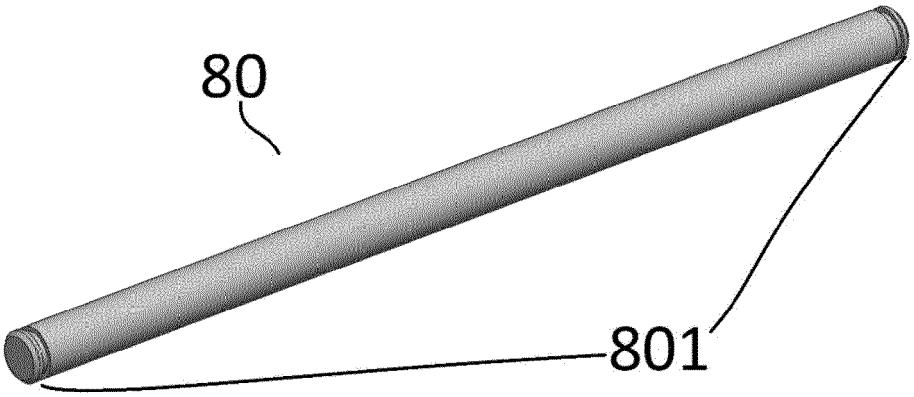

Fig. 5

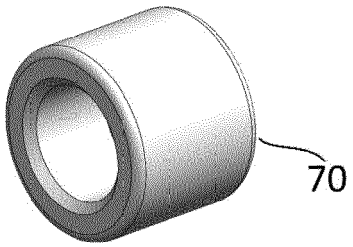

Fig. 6

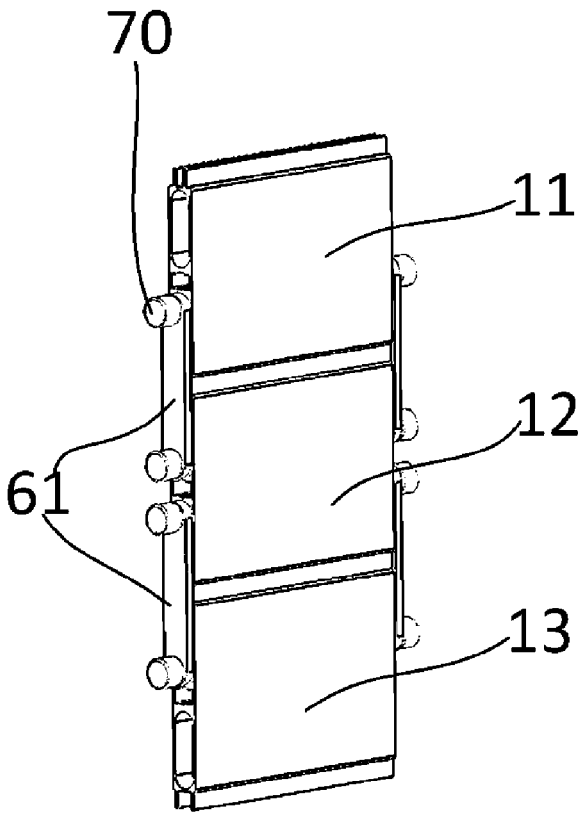

Fig. 7

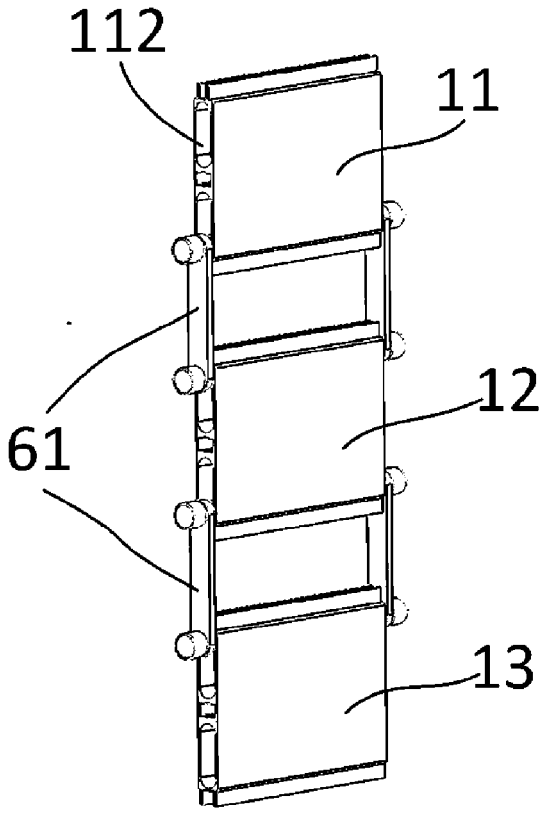

Fig.8

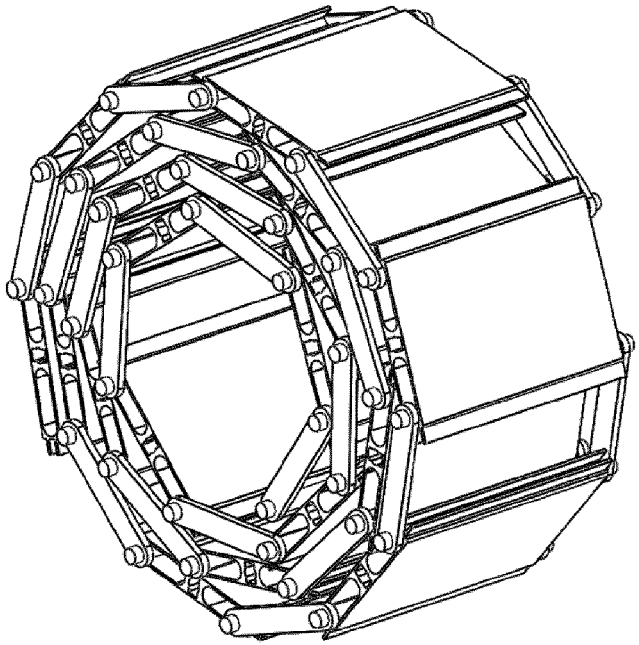

Fig. 9

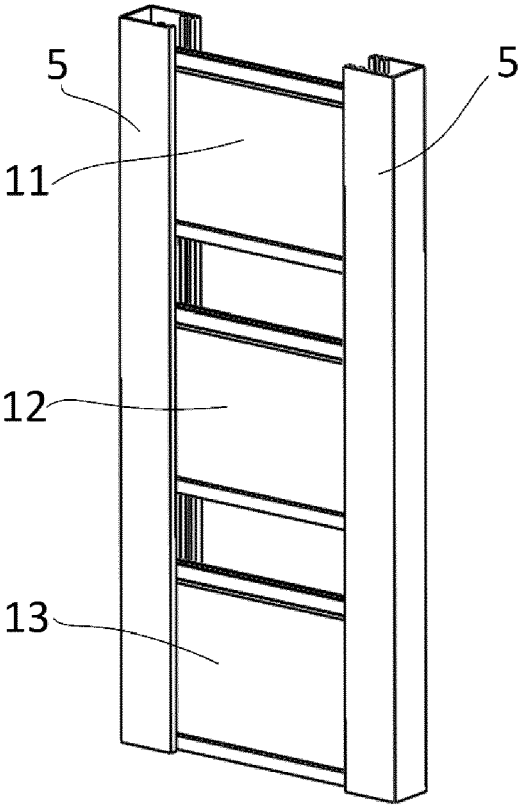

Fig. 10

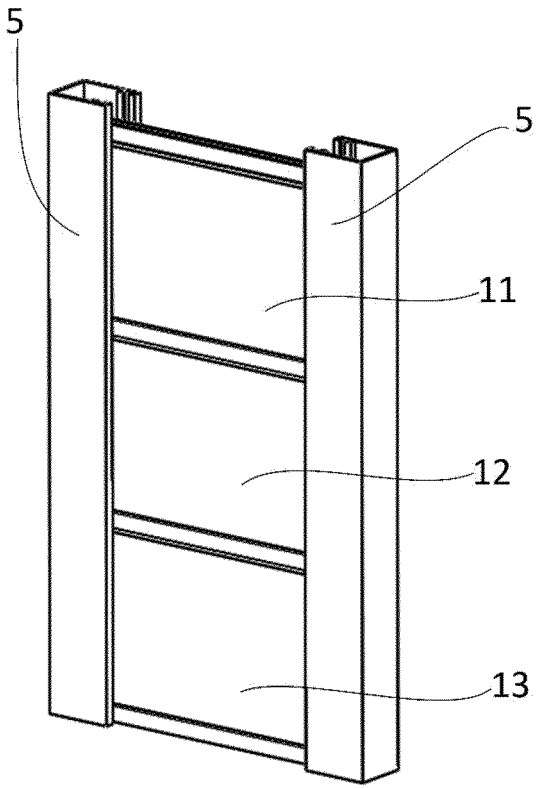

Fig. 11

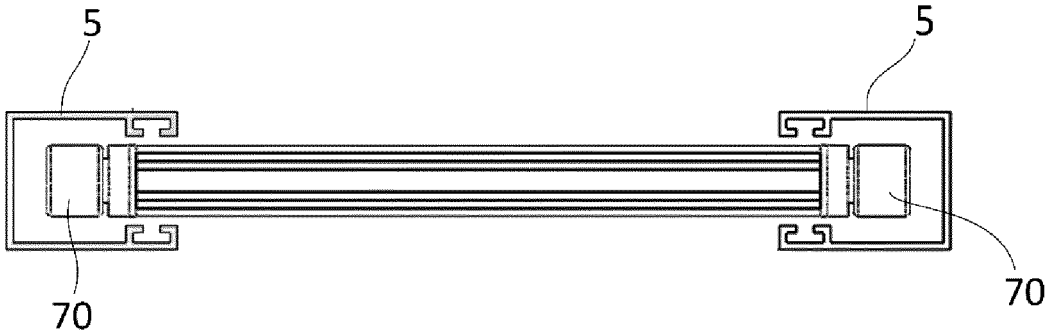

Fig. 12

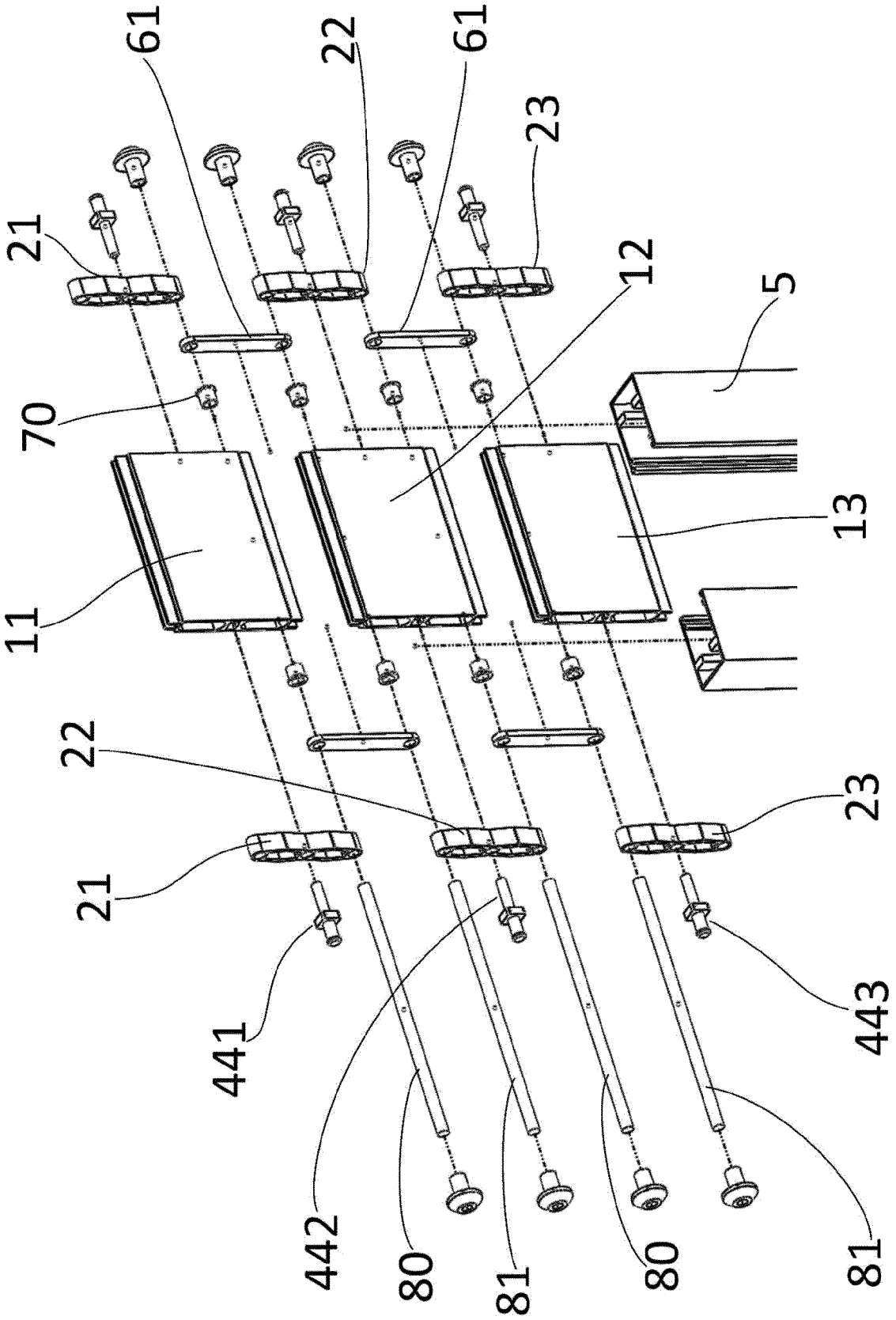

Fig. 13

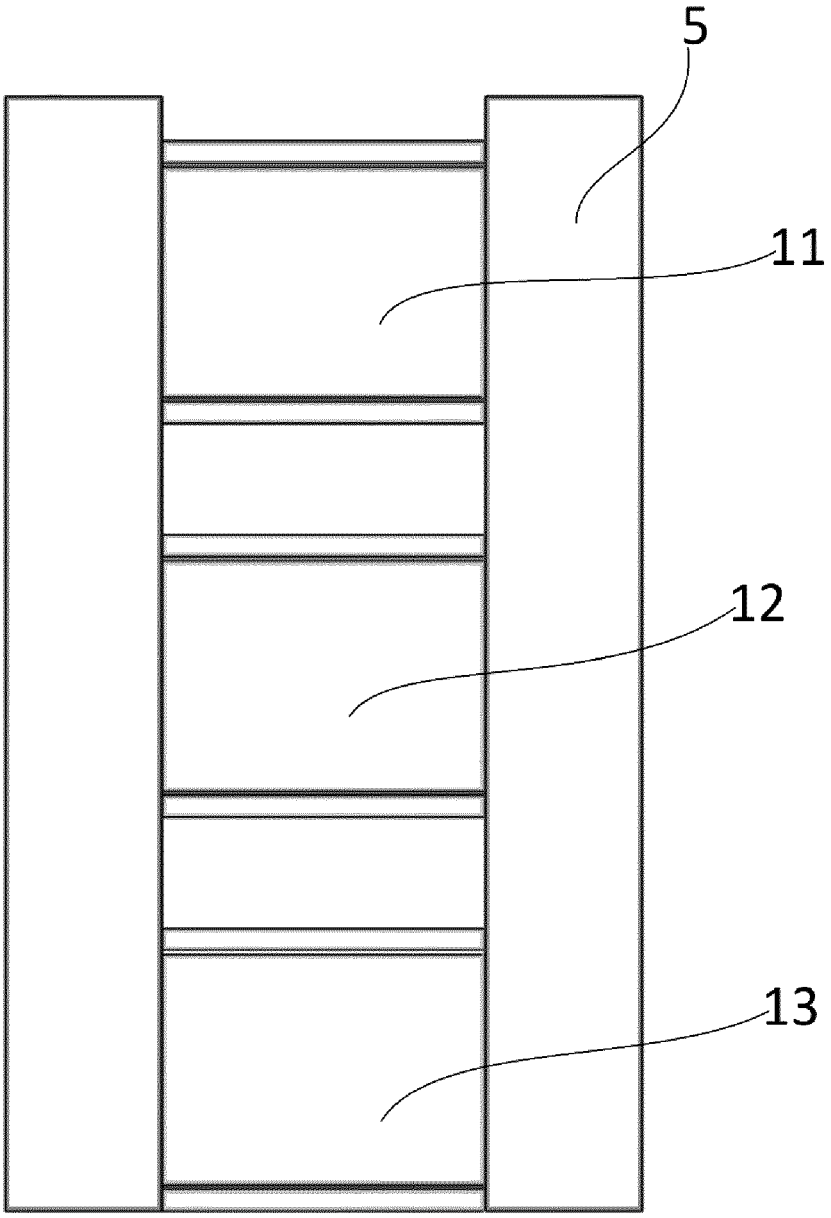

Fig. 14

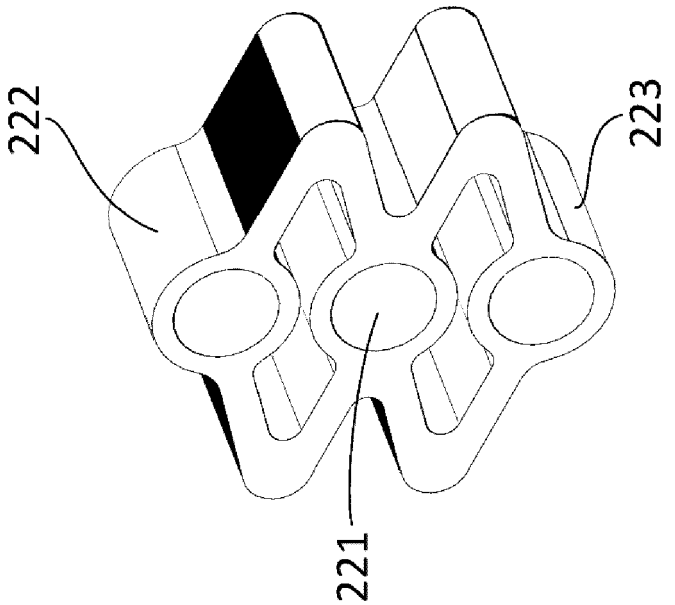

Fig.17

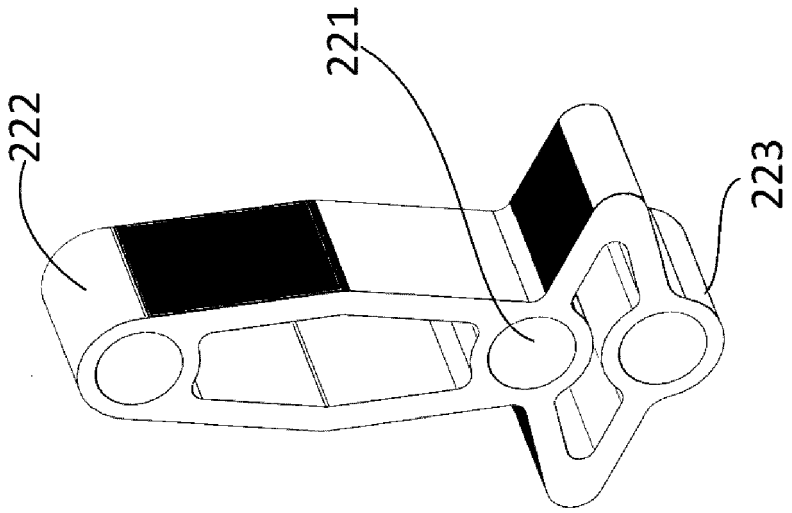

Fig.16

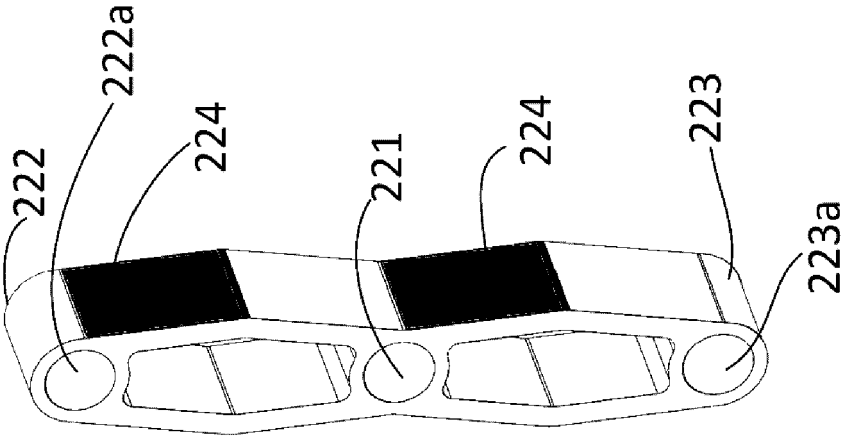

Fig. 15

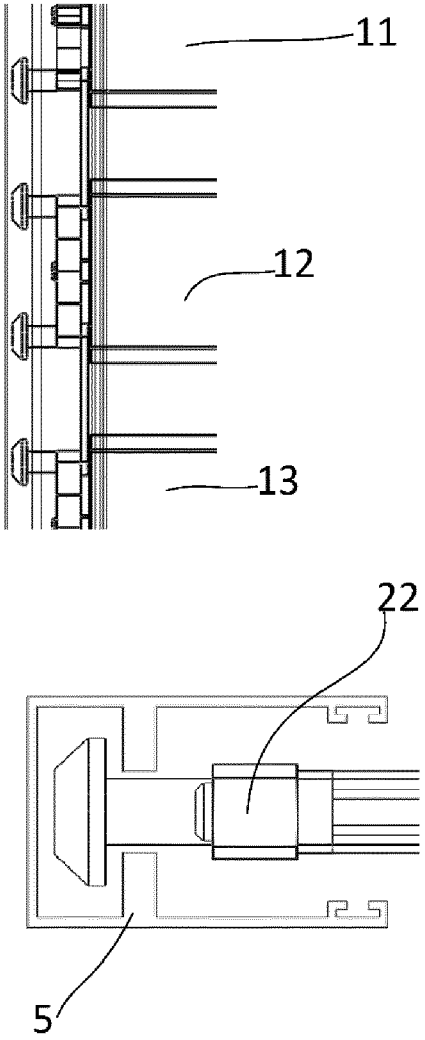

Fig. 18

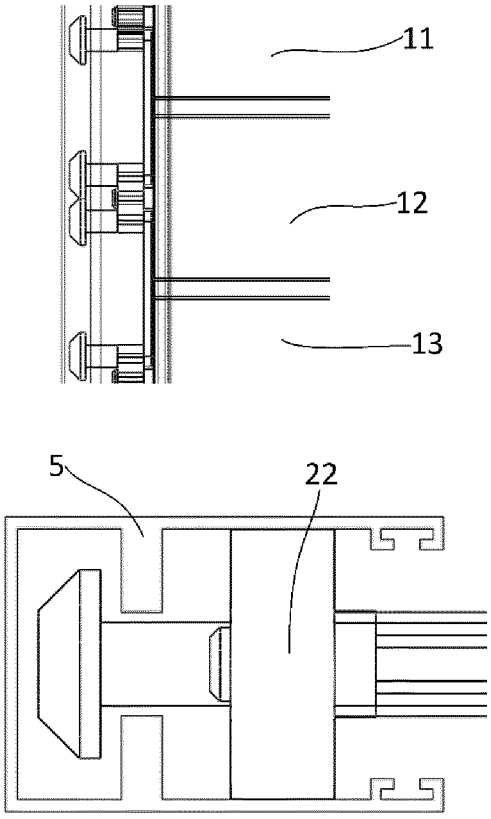

Fig. 19

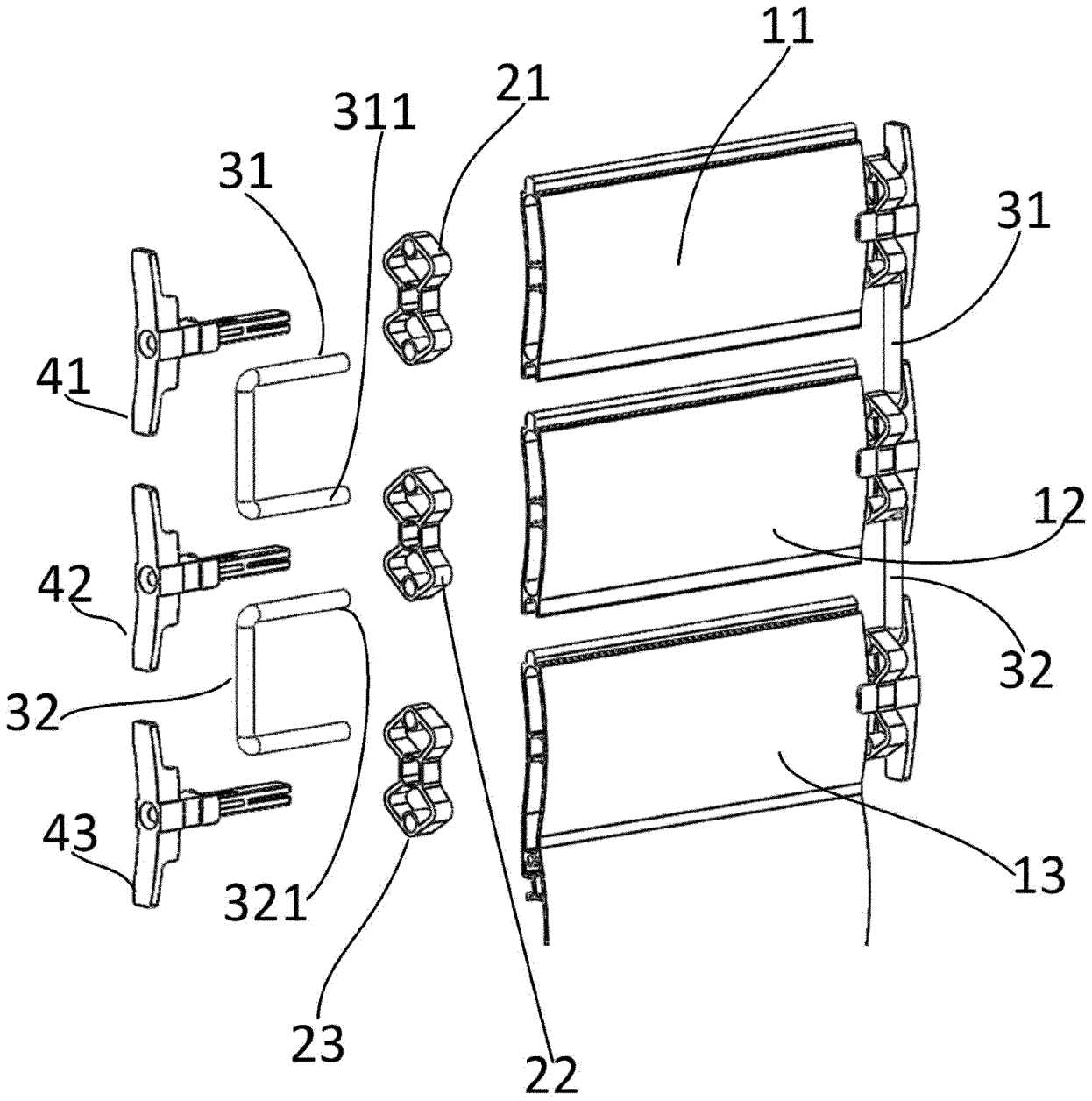

Fig.20

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EUROPEAN SEARCH REPORT

Application Number
EP 21 17 6935

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	EP 3 184 726 A1 (TENDA SISTEM SRL [IT]) 28 June 2017 (2017-06-28) * paragraphs [0012] - [0023]; figures 1-10 *	1-10	INV. E06B9/15 E06B9/86 E06B9/165
A,D	EP 1 728 965 A2 (VIUDA DE RAFAEL ESTEVAN GIMENE [ES]) 6 December 2006 (2006-12-06) * abstract; figure 1A *	1-10	

TECHNICAL FIELDS SEARCHED (IPC)

E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	31 March 2022	Kofoed, Peter

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31-03-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 3184726 A1	28-06-2017	EP 3184726 A1	28-06-2017
		ES 2707503 T3	03-04-2019
		HR P20190090 T1	05-04-2019
		HU E041660 T2	28-05-2019
		PT 3184726 T	01-02-2019
		TN 2016000570 A1	04-04-2018
EP 1728965 A2	06-12-2006	EP 1728965 A2	06-12-2006
		ES 2255383 A1	16-06-2006
		WO 2005089041 A2	29-09-2005

EPO FORM P0459

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Patent documents cited in the description

- IT BA2013A000002 **[0004]**
- ES 2335372 **[0004]**
- IT 1394469 **[0004]**
- EP 3184726 A **[0004]**
- IT BA2012A000023 **[0006]**
- EP 1728965 A2 **[0007]**