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(54) ROLLING SHUTTER WITH STACKABLE TELESCOPIC LATHS

(57) A rolling shutter (1) is configured to be connected to a winding roller (3) and to be slidingly engaged along lateral support guides (5), the rolling shutter (1) comprising a plurality of laths (2, 2') and of hooks (4), wherein the laths (2, 2') are mutually movable connected by means of the hooks (4), wherein each of the laths (2, 2') comprises a top portion (11) along the which is delimited a first linear groove which extends for the entire lath

(2, 2') and a bottom portion (12) along which a second linear groove is defined which extends for the entire lath (2, 2'), the hooks (4) are configured to slidingly engage the first linear groove and the second linear groove of the laths (2, 2') along said first direction (7), and to allow the approach, the removal and the relative rotation of the laths (2, 2') connected by means of the hooks (4).

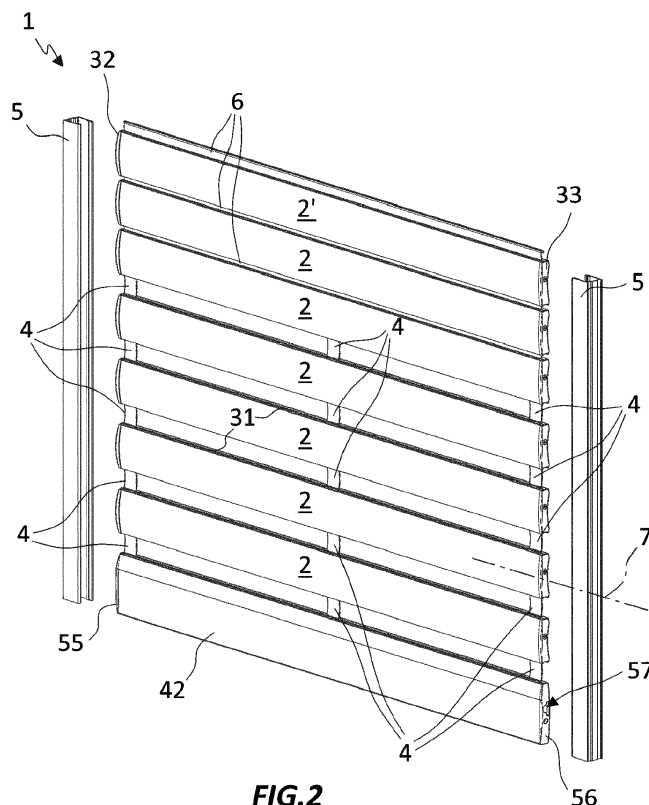


FIG.2

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Description

[0001] The present invention relates to a rolling shutter, comprising telescopic laths that can be stacked reciprocally, aimed at the sector of building frames for civil and/or industrial use.

[0002] Various solutions are known of rolling shutter systems that can be rolled up around a roller, housed inside a box placed on the top of a window or the like, comprising a plurality of mutually connected telescopic laths. The individual laths can move relatively to each other, to provide a sunshade sheet able to partially obscuring, totally occluding or freeing the opening of a window frame in front of which they are installed.

[0003] A traditional type of rolling shutter comprises a plurality of telescopic laths connected at their respective ends by means of hooks, so as to allow the individual laths to approach or move away from each other. Furthermore, the laths thus connected can rotate relatively to each other to allow the winding of the sunshade around a roller.

[0004] The hooks, in particular, are U-shaped and have two arms parallel and spaced apart capable of engaging laterally in respective seats provided at the opposite ends of each lath. In practice, the two parallel arms are inserted inside respective seats provided in the laths, while the central portion remains outside the end of the laths.

[0005] Each lath has two seats configured to allow the mobility of a respective arm housed inside them along a direction substantially orthogonal to the longitudinal development direction of each lath.

[0006] Such a rolling shutter has some application limits with particular reference to its structural rigidity. In fact, the individual laths are mutually connected exclusively at their ends, thus resulting yielding and subject to bending at their central portion which is allowed to flex.

[0007] In practice, such a shutter must be made with a limited longitudinal length, understood as the dimension along which the individual laths extend, thus limiting their usability.

[0008] It should be noted that the instability of the laths also manifests itself in the case wherein the rolling shutter has a reduced longitudinal dimension but is subject to the action of the wind, resulting in the generation of vibrations and noise.

[0009] A further drawback that afflicts such a shutter concerns the complexity of its assembly, with particular reference to the use of axial locking elements to constrain the individual hooks to the respective laths along the longitudinal direction, and prevent them from accidentally coming out and causing the separation between the individual laths.

[0010] Document EP 3184726 A1 describes a rolling shutter with telescopic laths wherein the laths are mutually connected only at their ends.

[0011] Documents EP 1096098 A2 and EP 0367212 A2 describe further embodiments of shutters wherein the laths are connected to each other by means of single

elongated connecting elements. Each elongated connecting element is interposed between two consecutive laths to be mutually connected. The individual elongated connecting elements have substantially the same extension or length as the laths to which they are connected.

[0012] The purpose of the present invention is to allow in a simple, efficient and economical way the realization of a shutter with telescopic laths of high mechanical strength, which is practical and easy to assemble, able to overcome the drawbacks of traditional solutions disclosed above.

[0013] Another object of the present invention is to provide a rolling shutter with a reduced winding size, understood as the space occupied by the shutter completely wrapped around a drive roller and compatible with the side guides used for traditional type rolling shutters.

[0014] A further object of the present invention is to provide a rolling shutter with reduced operating noise to promote high acoustic comfort during its use.

[0015] Specific object of the present invention is a rolling shutter configured to be connected to a winding roller and to be slidably engaged along lateral support guides, wherein the rolling shutter comprises a plurality of laths and hooks, wherein each of the laths is movably connected to a following between the laths by at least two of the hooks, wherein each among the laths comprises a top portion along which a first linear groove is delimited which longitudinally extends along the lath along a first direction and a bottom portion along which a second linear groove is delimited which extends along the first direction of the lath, wherein the hooks are configured for slidably engage the first linear groove and the second linear groove, wherein each among the hooks can be arranged along the first linear groove and the second linear groove in a predetermined position, the hooks being arranged spaced to each other along the first direction, for the mutual connection of the laths stacked in succession and to allow a relative movement of approaching, moving away and rotation between the laths.

[0016] According to another aspect of the invention, the second linear groove can be in communication with a channel which develops internally to the lath along the first direction, wherein the first channel is configured to slidably house at least a portion of the top of a respective one among the hooks so as to allow the extraction or partially retraction of the top portion with respect to the bottom portion through the second linear groove.

[0017] According to a further aspect of the invention, the lath can be delimited by a first wall and a second wall connected to each other through at least a first partition, wherein the at least one first partition delimits a top portion of the channel configured to selectively act as abutment for a portion top of each of the hooks which are slidably engaged in the channel.

[0018] According to an additional aspect of the invention, each of the hooks can be an extruded ribbon-shaped element and has a first hooking element which protrudes from a bottom portion of each one among the hooks, a

second hooking element which extends from a top portion of each one among the hooks and a central connection portion interposed between the top portion and the bottom portion.

[0019] According to another aspect of the invention, the central connection portion can be configured arched.

[0020] According to a further aspect of the invention, the first hooking element can be configured to achieve a shape coupling, in abutment, with a first curved element which extends at the top portion of the lath and wherein the second hooking element is configured to achieve a shape coupling, in abutment, with a second curved element which extends at the bottom portion of the lath.

[0021] According to an additional aspect of the invention, the first curved element has a concavity facing the bottom portion of the lath and wherein the second curved element has a concavity facing the top portion of the lath.

[0022] According to another aspect of the invention, the lath can comprise a third curved element at the bottom portion, wherein the third curved element partially extends through a thickness of the lath opposed to the second curved element and separated from it so as to delimit the second linear groove.

[0023] According to a further aspect of the invention, the third curved element can have a concavity facing the top portion of the lath and it is configured to be selectively arranged in abutment against a third hooking element which protrudes cantilevered from a top portion of the second hooking element with said hook engaged inclined relative to the lath.

[0024] According to an additional aspect of the invention, the lath can comprise a second partition at the top portion spaced from the first curved element, wherein the second partition is curved and has a concavity facing the top portion and delimiting with the first curved element a seat for housing the first hooking element of a respecting among the hooks.

[0025] According to another aspect of the invention, the rolling shutter can comprise at least one connecting element for the connection of a first among the laths at the winding roller, wherein the at least one connecting element has a length along the first direction similar or comparable to that of the laths along the first direction.

[0026] According to a further aspect of the invention, the rolling shutter can comprise at least one gasket configured elongated to be engaged, by means of a shape coupling, along the first linear groove in an interposed position between pairs of the hooks positioned along the first linear groove of the same lath among the laths, the at least one gasket being configured to seal the first linear groove.

[0027] According to an additional aspect of the invention, the lath can comprise a first protrusion which protrudes from the top portion on the opposite side with respect to that from which the first curved element departs, the first protrusion extending along the lath along the first direction, and wherein the lath comprises a second protrusion which protrudes from the first curved element to-

wards the outside of the lath, the first protrusion and the second protrusion defining respective sides, parallel to each other, engageable, by means of a shape coupling, against a respective seat delimited along the bottom portion of the lath.

[0028] According to another aspect of the invention, the second curved element and the third curved element can be arranged spaced from the end of the bottom portion to delimit the linear housing seat for housing the top portion of a further lath against which it is configured to be selectively placed in abutment.

[0029] Furthermore, the specific object of the present invention is a kit of components for mounting a rolling shutter comprising:

- a plurality of laths, and
- a plurality of hooks,

wherein the laths are configured to be movably connected to each other by means of the hooks, wherein each of the laths comprises a top portion along which a first linear groove extending longitudinally along the lath along a first direction is delimited and a bottom portion along which a second linear groove extending along the first direction of the lath is delimited, wherein the hooks are configured to slidably engage the first linear groove and the second linear groove for the mutual connection of the laths stacked in succession with each other and for allowing a relative movement of approaching, moving away and rotating between the laths.

[0030] The advantages offered by the rolling shutter according to the invention are evident.

[0031] In particular, the rolling shutter according to the invention has a high mechanical strength, as part of a solution that is easy to assemble and build.

[0032] Furthermore, the rolling shutter according to the invention has a high modularity, that means the ability to be able to create various formats of shutter while requiring a limited number of components compared to traditional rolling shutters.

[0033] The rolling shutter according to the invention is able to slide inside the common standard guides for rolling shutters/roller shutters and to wind itself inside the traditional boxes, making it practical and flexible to use even in replacement of traditional rolling shutter or roller shutters already installed.

[0034] The present invention will now be described, for illustrative but not limitative purposes, according to its preferred embodiments, with particular reference to the Figures of the attached drawings, wherein:

Figure 1 shows a perspective schematic view of a roller shutter according to the invention in an operational configuration of partial opening;

Figure 2 shows a schematic perspective view, partially exploded, of a further version of a rolling shutter according to the invention, in the operating configuration of partial opening;

Figure 3 shows an exploded view of some components of a rolling shutter according to the invention; Figure 4 shows a perspective view of a component of the rolling shutter according to the invention (FIG. 4a) and a further perspective view, from an opposite perspective, of this component (FIG. 4b); Figure 5 shows a perspective view of a component of the rolling shutter according to the invention; Figure 6 shows an exploded view of some components of a rolling shutter according to the invention; Figure 7 shows a perspective view of a component of the rolling shutter according to the invention; Figure 8 shows a side section of some components of a rolling shutter according to the invention in a partially raised configuration (Fig. 8a) and a partial perspective view of them (Fig. 8b); Figure 9 shows a side sectional view of some components of a rolling shutter according to the invention in a completely lowered configuration (Fig. 9a) and a partial perspective view of them (Fig. 9b); Figure 10 shows a side sectional view of a portion of the rolling shutter partially wrapped around a winding roller; Figure 11 shows a side sectional view of two laths of the rolling shutter according to the invention in a stacked configuration (Fig. 11a), in a spaced and aligned configuration (Fig. 11b) and in a spaced and inclined configuration (11c); Figure 12 shows a side sectional view of further two laths of the rolling shutter according to the invention in a stacked configuration (Fig. 12a), in a spaced and aligned configuration (Fig. 12b) and in a spaced and inclined configuration (Fig. 12c);

[0035] The rolling shutter according to the invention, hereinafter referred to as shutter for the sake of brevity, is wholly indicated with 1.

[0036] The shutter 1 comprises a plurality of mutually movable laths 2 connected.

[0037] The laths 2, in fact, can mutually assume a stacked position, wherein they are stacked reciprocally and arranged against each other (see Figures 9a, 9b, 11a and 12a) to define a blackout sheet, a spaced position, wherein the individual laths 2 are separated from each other with a predetermined distance, to define openings for the passage of light through the sheet (see Figures 1, 2, 8a, 8b, 11b and 12b), and an inclined position, wherein the individual laths 2 are inclined to each other (see Figures 11c and 12c) to allow them to be wound around a winding roller 3 (schematically illustrated in Figure 10).

[0038] The shutter 1 comprises hooks 4 for mutual connection between the individual laths 2.

[0039] Each lath 2 is connected to a subsequent lath 2 by means of at least two hooks 4 according to methods that will be better described below (see Figures 1 and 2, in Figure 1 only a row of hooks 4 aligned with each other due to the perspective is visible).

[0040] The shutter 1 comprises lateral support guides 5 for supporting the laths 2 themselves (see, for example, Figures 1 and 2).

[0041] The guides 5 are configured as elements shaped like a "C" or "U" or similar and define a sliding guide to support the shutter 1 at its ends, i.e. at the opposite ends of the laths 2, in a configuration assembly and to guide its sliding between a raised, partially raised position (see Figures 1, 2, 8a and 8b) or fully lowered (see Figures 9a and 9b).

[0042] The shutter 1 is shaped, if desired, to slide along guides 5 of a traditional type, for example of the type provided along a frame of a door, French door or window, to guide a linear sliding of the shutter 1 inside them during the opening operations/lifting and closing/lowering of the same.

[0043] The shutter 1 comprises at least one connecting element 6, for the reciprocal connection between at least two first laths that define the top of the shutter 1. In other words, by first laths it is meant a first lath 2' at the top of the shutter 1, which can be connected to the winding roller 3 (see Figure 10) by means of traditional connection elements, not shown in the attached Figures, and one or more laths 2 subsequently connected to said first laths 2'. The first lath 2' has the same conformation as the laths 2, thus limiting the type of components necessary for the assembly of the shutter 1 according to the invention.

[0044] The at least one connecting element 6 has an elongated conformation, with a length similar to that of the laths 2, 2' to which it is connected, differing from the conformation of the hooks 4 which, on the contrary and as better described later, are narrow.

[0045] The number of the first laths 2' may vary depending on the size of the shutter 1 or the diameter and shape of the winding roller 3 in order to ensure the correct connection between the top portion of the sunshade 1 and the winding roller 3 itself.

[0046] According to an alternative embodiment, the shutter 1, not shown in the attached figures, comprises only hooks 4 for the mutual connection between the laths 2, 2'.

[0047] Each lath 2, according to a preferred embodiment of the invention, is shaped like an extruded aluminum profiled element, although it is understood that it is possible to provide alternative versions made of other metal materials, such as steel, or of highly thermoplastic resistance, such as PVC.

[0048] The lath 2 is shaped as a hollow elongated body which extends along a first direction 7 or longitudinal direction (see Figures 1 and 3).

[0049] The lath 2 has a first wall 8 and a second wall 9, spaced apart and joined by a first partition 10 and a second partition 16 interposed between them and spaced apart (see Figure 3). The first wall 8, the second wall 9, the first partition 10 and the second partition 16 extend for the entire length of the lath 2 along the first direction 7. Preferably, the first partition 10 is substantially orthogonal to the first wall 8 and to the second wall 9.

[0050] The first partition 10 and the second partition 16 each act as a stiffening element for the lath 2, increasing its flexural strength along the first direction 7.

[0051] The lath 2 has a top portion 11, a bottom portion 12 and a central portion 13 which acts as a connection between the top portion 11 and the bottom portion 12.

[0052] The top portion 11 of a lath 2 is configured to meet, with shape coupling, with the bottom portion 12 of a further lath 2 stacked on it.

[0053] In particular, the top portion 11 engages a complementary seat delimited at the bottom portion 12 of a further lath 2 stacked thereon.

[0054] The first partition 10 is positioned in correspondence with the central portion 13.

[0055] The second partition 16 is positioned in correspondence with the top portion 11, as better described below.

[0056] The lath 2, at the top portion 11, has a first curved or hooked element 14 which extends from the second wall 9, facing the inside of the thickness of the lath 2, that is to say within a space delimited by the first wall 8 and second wall 9 (see Figure 3).

[0057] The first curved element 14 is separated from the first wall 8.

[0058] The first curved element 14 develops for the entire lath 2 along the first direction 7 and has a concavity facing the bottom portion 12 of this lath 2.

[0059] Similarly, the lath 2 has, at the bottom portion 12, a second curved or hooked element 15 which protrudes from the second wall 9, facing the inside of the thickness of the lath 2, i.e. inside a space bounded by the first wall 8 and the second wall 9 (see Figure 3).

[0060] The second curved element 15 is separated from the first wall 8.

[0061] The second curved element 15 extends at the bottom end of the second wall 9, for the entire lath 2 along the first direction 7.

[0062] The second curved element 15 has a concavity facing the top portion 11 of the lath 2. In practice, the first curved element 14 and the second curved element 15 of the same lath 2 are opposed to each other, meaning that they have their respective facing concavities with opposite direction (see Figure 3).

[0063] According to a preferred embodiment, illustrated in the attached Figures 3, 6, 8-12, the lath 2 has an arched cross section, so that the concavities of the first wall 8 and of the second wall 9 face the side wherein it is installed the winding roller 3 of the shutter 1. In other words, the concavity of the first wall 8 and of the second wall 9 is in agreement with the winding curvature around the winding roller 3.

[0064] More generally, it should be noted that the shutter 1 can be installed both on internal boxes of a building, i.e. with the wall 8 facing the outside of the building, and on external boxes, i.e. installed on the external facades of a building, with the wall 8 of the lath 2 facing the interior of this building. Regardless of the installation position of the box wherein to install the sunblind 1, the wall 9 always

faces to face the winding roller 3. With reference to the attached Figures, when the lath 2 is not wound on a winding roller 3, the first wall 8 faces outwards and second wall 9 faces inwards, i.e. facing the side where the winding roller 3 of the shutter 1 is installed, in order to facilitate the winding and unwinding of the shutter 1 relative to the winding roller 3 and to reduce the bulk of the shutter 1 itself in the wrapped configuration.

[0065] The arched lath 2 has a greater mechanical resistance to bending stresses, compared to a straight lath 2, since the arched profile of the first wall 8 and of the second wall 9 acts as a stiffener for the entire lath 2, against orthogonal stresses to the first wall 8 facing the second wall 9.

[0066] According to an alternative embodiment, not shown in the attached Figures, the lath 2 has a planar shape, substantially box-like, with the first wall 8 and the second wall 9 flat and parallel to each other.

[0067] As mentioned, the lath 2 has, at the top portion 11, the second partition 16.

[0068] The second partition 16 is configured curved and has a concavity opposed to the concavity of the first curved element 14 (see for example Figure 3). The second partition 16 therefore has a concavity facing the top portion 11 of the lath 2.

[0069] The second partition 16 mutually connects the ends of the first wall 8 and of the second wall 9 at the top portion 11, rigidly constraining them to each other.

[0070] The first curved element 14 and the second partition 16 define a seat between them which develops linearly for the entire lath 2, along the first curved direction 7, with reference to a plane orthogonal to the first direction 7 (such as for example a cross section plane according to the views of Figures 11a and 12a). The curved seat is configured to house one end of one of the hooks 4 connected to the lath 2 at the top portion 11, as better described below (see, for example, Figures 11 and 12).

[0071] In particular, the curved seat at the top portion 11 defines a holding and guiding element to allow relative rotation between the lath 2 and the hooks 4 engaged in the top portion 11 of the lath 2 itself, around an axis of rotation parallel to the first direction 7. Furthermore, the curved seat is configured to allow the sliding of the hooks 4 along the first direction 7.

[0072] The lath 2 has a first protrusion 17 which protrudes from the top portion 11, on the opposite side with respect to that from which the first curved element 14 projects.

[0073] With reference to the embodiment illustrated in the attached Figures, the first protrusion 17 protrudes from the top end of the first wall 8.

[0074] The first protrusion 17 extends for the entire lath 2 along the first direction 7, and is configured as a partition element (see Figure 3). In practice, the first protrusion 17 defines a first abutment side for the bottom portion 12 of a further lath 2 against which the lath 2, stacked in succession along the shutter 1, abuts.

[0075] The lath 2 delimits at the top portion 11 a first

linear groove that extends for the entire lath 2 along the first direction 7.

[0076] In particular, the first protrusion 17 and the first curved element 14, being mutually spaced, delimit the first linear groove from each other.

[0077] The lath 2 has a second protrusion 18 that protrudes from the first curved element 14 facing the outside of the lath 2 itself. The second protrusion 18 defines a second abutment side, parallel to the first protrusion 17, which extends from the top portion 11 to abut against a respective second side of the bottom portion 12 of a further lath 2 stacked in succession in a possible configuration of use.

[0078] As said, the lath 2 comprises a second curved element 15 at the bottom portion 12.

[0079] With reference to the embodiment illustrated in the attached Figures, it should be noted that the second curved element 15 is spaced from the bottom end of the second wall 9 by an offset distance equal to at least the distance with which the second protrusion 18 protrudes from the top portion of the first curved element 14 (see Figure 3).

[0080] The lath 2, at the bottom portion 12, has a third curved element or rib 19 that protrudes inside the thickness of the lath 2 starting from the first wall 8.

[0081] The third curved element 19 is separated from the second wall 9.

[0082] The third curved element 19 has a concavity facing the top portion 11 of the lath 2.

[0083] The third curved element 19 faces opposite to the second curved element 15. More in detail, the third curved element 19 protrudes from the first wall 8, spaced from a bottom end of the same with a distance equal to or substantially equal to the offset distance set of the second curved element 15.

[0084] The third curved element 19 and the second curved element 15 define abutments along the bottom portion 12 respectively for the first protrusion 17 and for the second protrusion 18.

[0085] The third curved element 19 and the second curved element 15 define a housing seat along the bottom portion 12 of the lath 2, configured to house the first protrusion 17 and the second protrusion 18 protruding from the top portion 11 by means of a shape coupling. The conformation of the top portion 11 and of the bottom portion 12 promotes the stacking between two successive laths 2, by means of shape coupling and, therefore, a stable connection resistant to the stresses acting frontally against the shutter 1 (or in other words, those stresses which act in thrust against the shutter 1 and which have at least one component orthogonal with respect to the first direction 7 of the laths 2, in particular from the first wall 8 to the second wall 9), such as for example the wind thrust.

[0086] The shutter 1 according to the invention, when arranged in a completely lowered configuration, with the laths 2 stacked together in mutual abutment (see for example Figures 9a and 9b), acts as a completely darkening

sheet as well as an anti-burglary barrier.

[0087] The lath 2 delimits, at the bottom portion 12, a second linear groove that extends for the entire lath 2 along the first direction 7.

5 **[0088]** In particular, the second curved element 15 and the third curved element 19 are mutually separated along a second direction 20 oriented along the thickness of the lath 2. Therefore, the second curved element 15 and the third curved element 19 define the second linear groove from each other.

10 **[0089]** The second linear groove is in communication with a channel 21 which extends along the entire lath 2 (see Figures 3, 11 and 12).

15 **[0090]** In particular, the channel 21 has a top delimited by the first partition 10, laterally the channel 21 is delimited by the first wall 8 and by the second wall 9 and on the bottom it is partially delimited by the second curved element 15 and by the third curved element 19.

20 **[0091]** At the bottom of the channel 21, in fact, the second linear groove is delimited through which at least partially each of the hooks 4 protrudes.

[0092] It is evidenced that the lath 2 includes a further channel 22 that extends for the entire lath 2 along the first direction 7 (see Figures 3, 11 and 12).

25 **[0093]** The further channel 22 has a top delimited by the second partition 16, laterally it is delimited by the first wall 8 and by the second wall 9 and has a bottom delimited by the first protrusion 10.

[0094] The further channel 22 thus configured guarantees high rigidity to the lath 2.

30 **[0095]** The channel 21 defines a housing along which at least a portion of at least one of the hooks 4 is slidingly engaged.

35 **[0096]** More in detail, each of the hooks 4 is configured as a ribbon-like element which has a first hooking element 23, which protrudes from a bottom portion of each of the hooks 4, a second hooking element 24, which protrudes from a portion of the top of each of the hooks 4 itself (see Figure 4), and a central connection portion interposed between them.

40 **[0097]** It should be noted that the term "ribbon-like" means that each of the hooks 4 has an elongated, ribbon or band conformation along a direction perpendicular to the first direction 7 and passing through the bottom portion and the top portion of this hook.

45 **[0098]** According to a preferred embodiment, the hooks 4 are extruded metal elements, made of aluminum. It is understood that the hooks 4 can be made of further metallic materials, such as steel, or in a high-strength thermoplastic material such as, for example, PVC.

50 **[0099]** The first coupling element 23 is configured to achieve a shape coupling with the first curved element 14 of the lath 2.

55 **[0100]** In particular, the first hooking element 23 and the first curved element 14, when mutually coupled, define a rotating connection able to allow at least a relative partial rotation between a respective one of the hooks 4 and the lath 2 around an axis parallel to the first direction

7.

[0101] Similarly, the second coupling element 24 is configured to achieve a shape coupling with the second curved element 15 of the lath 2. The second coupling element 24 and the second curved element 15, when mutually coupled, define a rotating connection able to allow at least a relative partial rotation between a respective one of the hooks 4 and the lath 2 about an axis parallel to the first direction 7.

[0102] The first hooking element 23 and the second hooking element 24 have respective concavities opposite each other.

[0103] The second hooking element 24 is configured to engage the second linear groove defined at the bottom portion 12 of the lath 2. In this regard, each of the hooks 4 has a thickness whose dimension is smaller than the width of the second linear groove, considered as a dimension extending along the second direction 20 (see Figure 3).

[0104] Furthermore, the second coupling element 24 is configured to slide in the channel 21 along a third direction 25 which is orthogonal to the first direction 7 and to the second direction 20 (see Figure 3). In other words, the third direction 25 is orthogonal to the longitudinal direction along which the lath 2 extends and to the thickness of the lath 2 itself.

[0105] By engaging the second hooking element 24 of a respective one between the hooks 4 inside the channel 21, this hook among the hooks 4 is constrained inside a lath 2 while the first hooking element 23 extends outside this lath 2, protruding from the bottom portion 12 of the same.

[0106] As said, each of the hooks 4 when coupled to the laths 2 can slide in the channel 21 along the third direction 25, approaching or moving away the first hooking element 23, and similarly the second hooking element 24 connected to it, relative to the portion bottom 12 of the lath 2 wherein said hook between the hooks 4 is engaged. Moreover, being able to slide along the second linear groove, it is possible to easily position each of the hooks 4 in the predetermined position along the same blade 2, that is to say along the first direction 7.

[0107] In this way it is possible to establish the positioning of the connection points between the individual laths 2 according to specific needs, for example to optimize the distribution of stresses along each lath 2.

[0108] This characteristic is determined by the fact that, as mentioned, each of the hooks 4 has a ribbon-like conformation and, therefore, its dimension along the first direction 7 is much smaller than the dimension of the lath 2 along this first direction 7.

[0109] According to a preferred embodiment, the central connection portion between the first hooking element 23 and the second hooking element 24 is arched, to promote the mobility of each of the hooks 4 inside a respective channel 21 wherein it is busy.

[0110] The central connecting portion of each of the hooks 4, when configured arcuate, defines a concavity

which (when this hook between the hooks 4 is inserted in the channel 21 of a lath 2) faces opposite to that of the first wall 8 and of the second wall 9 of the lath 2 (see Figures 6, 8a and 9a).

[0111] This conformation of the central connection portion of each of the hooks 4 promotes the movement of the same with respect to the lath 2, preventing jamming or jamming during its insertion or extraction relative to the channel 21 through the second linear groove.

[0112] Each of the hooks 4 has a third hooking element 26 configured to engage in abutment, by means of a shape coupling, with the third curved element 19 of the lath 2 (see Figures 4 and 12c). In particular, the abutment between the third hooking element 26 and the third curved element 19 is configured when this hook among the hooks 4 is coupled to the lath 2 in a position rotated around the first direction 7 - that is to say following the winding of the shutter 1 around the winding roller 3.

[0113] The third hooking element 26 extends for the entire length of each of the hooks 4, intended as a longitudinal extension of the hook itself (i.e. along a direction which, when the hook between the hooks 4 is connected to the strip 2, corresponds to the first direction 7).

[0114] The third hooking element 26 protrudes, cantilevered, from a top portion of the second hooking element 24 and delimits a concavity facing the same direction as that of the second hooking element 24 itself.

[0115] The third hooking element 26 is not an obstacle to the free sliding of each of the hooks 4 inside a respective channel 21, along the third direction 25 and along the first direction 7.

[0116] The third hooking element 26, similarly to the first hooking element 23 and the second hooking element 24, also acts as a stiffening element for each of the hooks 4.

[0117] In this regard, it should be noted that in the shutter 1, in the winding configuration, following the relative rotation between each of the hooks 4 and the lath 2 engaged, the third hooking element 26 abuts against the third curved element 19 of the lath 2 along which this hook among the hooks 4 is engaged, thus determining a further stiffening element for the lath 2. In this way it is prevented that the weight of the underlying laths 2, connected in succession, can cause a bending of the lath 2 along the first direction 7, and in particular a bending of the second wall 9. A high structural stability of each lath 2 is thus ensured, understood as the ability to maintain the geometry of the first wall 8, of the second wall 9 as well as their reciprocal positioning unchanged (see, for example, example, Figures 10 and 12c).

[0118] As mentioned, the shutter 1 comprises at least one connecting element 6 for fixing between the laths 2 of the top portion of a shutter 1 connected to the winding roller 3 through the first top lath 2'.

[0119] The at least one connecting element 6 is elongated along the first direction 7 and has a cross section configured similar to that of each of the hooks 4 (compare the transverse views shown in Figures 11 and 12).

[0120] The at least one connecting element 6 differs from each of the hooks 4 as regards the dimensions along the first direction 7 and along a second direction, perpendicular to this, that is to say a direction that develops starting from a bottom portion of the at least one connecting element 6 facing a top portion thereof.

[0121] In particular, the at least one connecting element 6 has a dimension along the first direction 7 substantially similar to that of the laths 2 along the first direction 7 itself. The at least one connecting element 6 therefore has an elongated configuration along the first direction 7 and, overall, differs from the ribbon-like conformation of each of the hooks 4.

[0122] The at least one connecting element 6, similarly to the hooks 4, is configured to allow the mutual approach and separation between two laths 2 to which it is connected, as well as the relative rotation around the first direction 7.

[0123] The at least one connecting element 6 is preferably an extruded element made of metal material, such as aluminum. It is understood that it is possible to make the at least one connecting element 6 in other metal materials, such as steel, or in high-strength thermoplastic materials such as, for example, PVC.

[0124] The at least one connecting element 6 comprises a first connecting hook 27, a second connecting hook 28, placed at the opposite ends of the at least one connecting element 6 itself, and a central portion 29 interposed between them (see Figure 6).

[0125] The first connecting hook 27 is configured to selectively engage, by means of a shape coupling, the second curved element 15 at the bottom portion 12 of the lath 2.

[0126] The second connecting hook 28 is configured to couple, by means of a shape coupling, with the first curved element 14 at the top portion 11 of the lath 2. In particular, the second connecting hook 28 engages the curved seat at the portion at the top 11 of the lath 2.

[0127] The first connecting hook 27 protrudes from a top end of the at least one connecting element 6 while the second connecting hook 28 protrudes from a bottom end of the at least one connecting element 6 (see Figure 6). The first connecting hook 27 and the second connecting hook 28 protrude from the same side with respect to the central connecting portion 29, and have respective concavities facing opposite each other. In this regard, it should be noted that the first connecting hook 27 defines a concavity facing the bottom end of the at least one connecting element 6 while the second connecting hook 28 defines a concavity facing the top end of the at least one connecting element 6.

[0128] In practice, the at least one connecting element 6 has a cross section, that is, a section along a plane orthogonal to the longitudinal direction along which the at least one connecting element 6 itself develops, substantially shaped like a "C".

[0129] The at least one connecting element 6 differs from the hooks 4 as well as for the extension along the

first direction 7 also for the conformation of the central connection portion 29.

[0130] The central connecting portion 29, in fact, has a shorter length than the corresponding central connecting portion of the hooks 4. In other words, the first connecting hook 27 and the second connecting hook 28 have a smaller separation distance than that between the first hooking element 24 and the second hooking element 23 of the hooks 4. Consequently, the maximum separation distance at which two laths 2 connected to each other through a connecting element 6 can be arranged is lower than that which can be obtained through the use of hooks 4 for the connection of two blades 2 consecutive to each other.

[0131] The at least one connecting element 6 extends along a longitudinal direction which in the mounting configuration of the shutter 1 is aligned to the first direction 7.

[0132] The at least one connecting element 6 is configured to keep the laths 2 closer together, when provided in the winding configuration around the winding roller 3, with respect to the inclined configuration between the laths 2 which are connected by hooks 4 (see for example the configurations assumed between two blades 2 illustrated in the attached Figures 11c and 12c).

[0133] The use of at least one connecting element 6 is preferable for the connection between the laths 2 arranged at the top portion of the shutter 1 connected to the winding roller 3 through the first top lath 2'. The number of such laths 2 belonging to the top portion of the sunshade 1 can vary according to specific requirements of use, with reference to the overall weight of the shutter 1 or to its extension along the first direction 7.

[0134] As mentioned, preferably, the at least one connecting element 6 extends along the entire length of the shutter 1 along the first direction 7 and, therefore, provides a stiffening element capable of ensuring a stable connection of the laths 2, 2' in proximity to the winding roller 3 which, in use, are subjected to greater stresses than the laths 2 distal therefrom.

[0135] The use of the at least one connecting element 6 allows the laths 2 of the top of the shutter 1 to be arranged substantially against the winding roller 3, during the winding phase, thus reducing the size of the shutter 1 in a rolled-up use configuration (see the diagram in Figure 10). This conformation allows the use of the shutter 1, if desired, in traditional type boxes, promoting the use of the shutter 1 also as a replacement of a rolling shutter or traditional type shutter, already installed.

[0136] The at least one connecting element 6 comprises a third connecting hook 30 which protrudes from the first connecting hook 27 similarly to what is described in relation to the third curved element 19 of the hooks 4 (see Figure 6), to which reference should be made.

[0137] The third connecting hook 30 is configured to abut against the third curved element 19 of the lath 2 in the phase of maximum rotation between two contiguous laths 2 (see Figure 11c). In this way the mechanical connection of the laths 2 which, during the winding step, is

subjected to high stresses due to the weight of the underlying part of laths 2 of the shutter 1, is firm and resistant.

[0138] The first connecting hook 27, the second connecting hook 28 and the third connecting hook 30 define stiffening elements for the at least one connecting element 6, ensuring a high structural resistance to the shutter 1.

[0139] The shutter 1 comprises at least one gasket 31 shaped to engage, by means of a shape coupling, the curved seat delimited in correspondence with the top portion 11 of the lath 2 (see Figures 1, 2 and 8b), wherein the first element hook 23 of the hooks 4 can be engaged.

[0140] The at least one gasket 31 defines a sealing element which, in an assembly configuration, partially protrudes from the curved seat wherein it is housed to define an obstacle barrier to the entry of foreign bodies or dirt inside the seat itself.

[0141] In particular, the at least one gasket 31 extends partly outside the top portion 11 of the lath 2 and is shaped so as not to interfere with the shape coupling between the top portion 11 of the lath 2 wherein it is positioned and the bottom portion 12 of a further lath 2 stacked thereto.

[0142] The at least one gasket 31 has an arched or substantially arched section and is sized to abut against the bottom portion 12 of a lath 2 mounted above, thus attenuating any noises due to the impact between these portions during the stacking between 2 consecutive blades.

[0143] The at least one gasket 31 is preferably made of extruded plastic material, such as rigid plastic material.

[0144] In addition to acting as a sealing element between two consecutive stacked blades 2, the at least one gasket 31 acts as a spacer element, along the first direction 7, between the hooks 4 engaged along the same blade 2. The at least one gasket 31, in fact, is housed along the curved seat present in the top portion 11 of the lath 2, in a position interposed between two hooks 4 engaged in the curved seat itself (see for example Figure 2).

[0145] The at least one gasket 31, therefore, keeps two hooks 4 engaged along the same curved seat at a predefined distance, equal to the length of the at least one gasket 31 itself along the first direction 7.

[0146] The use of at least one gasket 31 is particularly useful in the event that the shutter 1 includes two or more hooks 4 for mutual connection between the individual laths 2.

[0147] With reference to the exemplary version illustrated in the attached Figure 1, the shutter 1 comprises a plurality of laths 2 mutually connected, in pairs, by means of two hooks 4 arranged at the opposite ends of the laths 2 themselves.

[0148] On the other hand, the attached Figure 2 illustrates a further version of the shutter 1 comprising a plurality of laths 2 mutually connected, in pairs, by means of three hooks 4 which, in turn, are mutually spaced along the first direction 7 by means of a first and a second gas-

ket 31, interposed between them.

[0149] It is understood that further versions of the shutter 1 comprising a greater number of hooks 4 arranged along respective linear grooves of the laths 2 are possible, depending on specific use requirements. In particular, the number and arrangement of the hooks 4 used for the mutual connection between pairs of laths 2 can vary according to the length of the laths 2 themselves along the first direction 7 and/or to aesthetic reasons.

[0150] In practice, being able to position several hooks 4 along the linear groove of the laths 2 allows to optimize the distribution along the first direction 7 of the load acting on the laths 2 avoiding a concentration of stresses only at the ends of the laths 2, a concentration which instead occurs manifested in the roller blinds described in relation to the state of the art.

[0151] Keeping the hooks 4 in position along the linear groove of the lath 2, i.e. along the first direction 7, ensures the correct connection between the individual laths 2 and prevents unwanted displacement of the mutual connection points between the laths 2, even after repeated actuation of the shutter 1 during its lowering or raising. In this way, a high structural strength of the shutter 1 is guaranteed as well as keeping the hooks 4 aligned with each other along respective directions parallel to the third direction 25.

[0152] The shutter 1 comprises terminal elements to be applied to the opposite ends of the lath 2. The terminal elements act as closing caps for the ends of the lath 2 for the purposes that will be described below.

[0153] The terminal elements comprise first terminal elements 32 and second terminal elements 33, configured to each other in a specular way, and designed to be connected to a respective end of the lath 2 (see Figures 2, 3 and 6).

[0154] In the following description, reference will be made to a first terminal element 32 since similar considerations apply in relation to the second terminal element 33.

[0155] The first terminal element 32 has a shaped portion comprising a raised profile comprising, in turn, at least one shaped protuberance 34 complementary to the cross section of the channel 21, to be engaged inside it.

[0156] With reference to the embodiment illustrated in the attached Figure 6, it should be noted that the raised profile of the first terminal element 32 has in addition to the at least one protuberance 34 also a second protuberance 35 configured to engage, by means of a shape coupling, an end of the second channel 22.

[0157] The first terminal element 32 then has a third protuberance 36 configured to engage with a shape coupling, if desired sealed, in the curved seat delimited in correspondence with the top portion 11 of the lath 2.

[0158] The protuberances 34, 35 and 36 sealingly engage the respective cavities present at the end of the lath 2, thus preventing dirt or debris from penetrating inside the cavities present along the lath 2 itself. The presence of foreign bodies or the accumulation of dirt inside the

cavities present in the lath 2 could in fact limit the mobility of the hooks 4 or of the at least one connecting element 6 movably engaged in the lath 2 itself, compromising the correct operation of the shutter 1.

[0159] Each terminal element 32, 33 also has, on a face facing the lath 2, a support plane 37 for abutment against a respective flat end of the lath 2 and at least two profiles 38 raised with respect to said support plane 37 (see Figure 6). The profiles 38 are shaped to adhere to the external geometry of the lath 2 in a coupling phase, in such a way as to ensure a shape coupling between the parts, as well as the occlusion of any points of light between each terminal element 32, 33 and the ends of the lath 2.

[0160] The lath 2 comprises a cylindrical or substantially cylindrical seat 39, advantageously in correspondence with the first partition 10, configured to delimit a housing which can be engaged by means of a screw 40 adapted to connect the first terminal element 32 and the second terminal element 33 to respective ends of the lath 2 (see for example Figures 3 and 6).

[0161] The seat 39 in fact develops for the entire length of the lath 2 along the first direction 7, thus being accessible to both ends of the lath 2 itself.

[0162] With reference to the version illustrated in the attached Figures 3, 6, 8 and 9, the seat 39 defines a through groove which extends along the entire length of the seat 39 itself along the first direction 7. In fact, a seat 39 thus configured allows a limited compliance at the ends of the lath 2 promoting the engagement of the screw 40 in the seat 39 itself and the recovery of any geometric tolerances.

[0163] The first terminal element 32, and similarly the second terminal element 33, each define a through opening 41 configured for receiving a respective screw 40 (see Figures 3 and 6). The through opening 41 is positioned along the first terminal element 32, and similarly along the second terminal element 33, so as to face the seat 39, when the first terminal element 32 and, respectively, when the second terminal element 33, are connected abutting against a respective end of the lath 2.

[0164] It should be noted that the first terminal element 32 and the second terminal element 33 prevent the accidental release of each of the hooks 4 engaged along the top portion 11 and the bottom portion 12 of the laths 2.

[0165] Furthermore, the first terminal element 32 and the second terminal element 33 prevent the accidental escape of the at least one gasket 31 engaged along the top portion 11 of the lath 2.

[0166] Below is a brief description of the assembly of a shutter 1 to a winding roller 3.

[0167] The top portion of a shutter 1 is assembled, i.e. the portion that in use is connected to the winding roller 3, providing at least a first lath 2' and a second lath 2 and connecting them reciprocally through at least one connecting element 6.

[0168] At least one connecting element 6 is connected to the top portion of a first lath 2', introducing the second

connecting hook 28 along the curved seat delimited at the top portion of the first lath 2'.

[0169] Continue by connecting the at least one connecting element 6 to the bottom portion 12 of the first lath 2'. In this regard, the first connecting hook 27 of this at least one connecting element 6 is inserted through the linear groove defined at the bottom portion 12 of the first lath 2'.

[0170] Then the at least one connecting element 6 is extracted from the bottom portion 12 of the first lath 2', moving the second connecting hook 28 away from the bottom portion 12 itself to allow the connection of a further lath 2 along the second connecting hook 28 same.

[0171] A further lath 2 is connected to the at least one connecting element 6 which protrudes from the bottom portion 12 of the first lath 2', then proceeding in the same way until the predetermined number of laths 2 of the top of the shutter 1 is obtained through respective connecting elements 6. For example, the predetermined number of laths 2 which are mutually connected by means of one or more connecting elements 6 is such as to allow an optimal initial winding of the shutter 1 around the winding roller 3 and to maintain one or more of the connecting elements 6 not visible on the outside of the shutter 1 during the actuation of the latter along the guides 5.

[0172] Then, at least a first of the hooks 4 is connected to the bottom portion 12 of the last blade 2 to which a connecting element 6 is connected at the top portion of the same.

[0173] Proceed by connecting the subsequent laths 2 through the hooks 4 in the same way as those described in relation to the positioning of at least one connecting element 6.

[0174] As said, for the mutual connection between two laths 2, in succession with each other in the configuration of use, at least two hooks 4 are provided (see Figure 1), although it is understood that it is possible to provide a greater number of hooks 4 depending on the length of the laths 2 along the first direction 7 (see for example Figure 2).

[0175] It should be noted that at least one gasket 31 is interposed between each of the hooks 4 and the next provided along the same lath 2, so as to obtain a positioning of each of the hooks 4 along the first direction 7 according to a predetermined pattern.

[0176] The reciprocal connection of further laths 2 is carried out in the manner described above until the predetermined length for the shutter 1 is obtained.

[0177] According to a preferred embodiment illustrated in the attached Figures 1 and 2, the shutter 1 comprises a bottom lath 42 which in the configuration of use is the lath that encounters against a ground stop (the surface of a pavement or more generally the ground).

[0178] The bottom lath 42 is an extruded element made of metallic material, such as aluminum, although it is intended that it can be made of other materials as described in relation to the lath 2, to which reference should be made.

[0179] With reference to the preferred embodiment illustrated in the attached Figure 7, the bottom lath 42 has a first flat wall 43 and a second flat wall 44, spaced apart and joined by at least one intermediate partition 45 interposed between them. The first flat wall 43, the second flat wall 44 and the at least one intermediate partition 45 extend for the entire length of the bottom lath 42, i.e. for the entire bottom lath 42 along the first direction 7. Preferably, the at least one intermediate partition 45 is orthogonal to the first flat wall 43 and to the second flat wall 44.

[0180] The bottom lath 42 includes a further intermediate partition 46 connecting the first flat wall 43 and the second flat wall 44, configured in a similar way to the at least one intermediate partition 45.

[0181] The further intermediate partition 46 and the at least one intermediate partition 45 act synergistically as stiffening elements for the bottom lath 42.

[0182] The bottom lath 42 has a top portion 47 and a bottom portion 48 mutually connected by means of a central portion 49 (see Figure 7).

[0183] The top portion 47 is configured similarly to the top portion 11 of the blade 2, to which reference is made, to house the first hooking element 23 of two or more of the hooks 4 and thus allow the connection between the bottom lath 42 and the lath 2.

[0184] The top portion 47 of the bottom lath 42 is configured to engage, with shape coupling, against the bottom portion 12 of the blade 2 stacked on the bottom lath 42 itself.

[0185] The bottom lath 42, at the top portion 47, has a curved element 50 which protrudes from the second flat wall 44 within the thickness of the bottom lath 42, i.e. inside a space delimited by the first wall flat 43 and second flat wall 44.

[0186] The curved element 50 is separated from the first flat wall 43.

[0187] The curved element 50 extends for the entire length of the bottom lath 42, along the first direction 7, and has a concavity facing the bottom portion 48 of the bottom lath 42.

[0188] Similarly to what is described in relation to the lath 2, the bottom lath 42 includes a curved top partition 51, which has a concavity opposed to the concavity of the curved element 50.

[0189] The curved top partition 51 mutually connects the ends of the first flat wall 43 and of the second flat wall 44 at the top portion 47 of the bottom lath 42, rigidly constraining them to each other.

[0190] The curved element 50 and the curved top partition 51 define a curved shaped top seat between them, with reference to the section of the top seat along a plane orthogonal to the first direction 7, configured to house a bottom end of the connected hooks 4 to a bottom lath 42.

[0191] The bottom lath 42 has a longitudinal protrusion 52 which protrudes from the top portion 47 of the bottom lath 42 itself, on the opposite side to that from which the curved element 50 protrudes.

[0192] The longitudinal protrusion 52 and the curved element 50 are mutually separated so as to define a linear seat between them corresponding to the first linear groove present along the lath 2. The width of the linear seat is greater than the thickness of the hooks 4, to allow movement along the first direction 7 and promoting their positioning according to a predetermined assembly scheme.

[0193] With reference to the embodiment illustrated in the attached Figure 7, the first longitudinal protrusion 52 extends from the first flat wall 43.

[0194] The first longitudinal protrusion 52 extends over the entire bottom lath 42, along the first direction 7, and is configured as a partition. The first longitudinal protrusion 52 defines an abutment side for the bottom portion 12 of a lath 2 stacked against the top portion 47 of the bottom lath 42 in a configuration of use.

[0195] The bottom lath 42, similarly to what has been described in relation to the lath 2, has a second longitudinal protrusion 53 which extends from the top of the curved element 50. The second protrusion 53 defines a further abutment side, parallel to the first longitudinal protrusion 52, configured to abut against a respective second side of the bottom portion 12 of a lath 2 stacked against the top portion 47 of the bottom lath 42.

[0196] The bottom lath 42 includes a circular seat 54 or substantially circular at one between the intermediate partition 45 and the further intermediate partition 46 for the same purposes described in relation to the seat 39 of the lath 2.

[0197] In practice, the seat 54 is configured to be engaged by a fastening screw not shown in detail in the attached Figures, for connecting a first bottom terminal element 55 or a second bottom terminal element 56 to the opposite ends of the bottom lath 42 itself (see Figure 2).

[0198] The first bottom terminal element 55 and the second bottom terminal element 56, similarly to what has been described for the first terminal element 32 and the second terminal element 33, have a profiled portion to engage, by means of shape coupling, respective ends of the bottom lath 42.

[0199] With regard to the connection methods of the first bottom terminal element 55 and the second bottom terminal element 56, reference should be made to what has been described in relation to the first terminal element 32 and the second terminal element 33.

[0200] At least one of the first bottom terminal element 55 and the second bottom terminal element 56 defines a cavity 57 for housing a lock or a locking element, for example a bolt, configured to block sliding, in a configuration of use of the bottom lath 42 along the guides 5, thus preventing the raising of the shutter 1 along the guides 5 (see Figure 2).

[0201] The bottom lath 42 has, at the bottom portion 48, a bottom partition 58 along which a longitudinal seat 59 is delimited, which extends for the entire bottom lath 42 along the first direction 7.

[0202] The longitudinal seat 59 is configured to house an abutment gasket, not shown in the attached Figures, able to abut against the ground against which the bottom lath 42 is placed when the shutter 1 is lowered to define a darkening or partially obscuring sheet.

[0203] The abutment gasket can also act as a shock-absorbing element to reduce the noise during the impact of the bottom lath 42 against the ground as well as a sealing element to avoid any passage of air and/or light between the bottom portion 50 of the bottom lath 42 and the ground when the system is in a completely closed position, wherein all the laths 2 are stacked together.

[0204] The person skilled in the art will easily understand how a shutter 1 according to the invention is able to achieve the intended purposes, resulting in a solution of easy assembly and high structural strength.

[0205] The shutter 1 also has a reduced number of components that can be connected together to obtain various assembly configurations for the shutter 1, as part of a solution capable of reducing production costs and those of stock management of the components to be assembled to obtain the shutter 1. By the expression assembly configurations it is meant the configurations that can be obtained for the shutter 1, different from each other in relation to the length of the shutter 1 along the first direction 7 or along a third direction 25 along which extends the shutter 1 itself.

[0206] The shutter 1 has a high structural strength which is guaranteed even in the case wherein the laths 2 have a high extension along the first direction 7. The use of several hooks 4 positioned spaced apart along the first direction 7 allows to distribute optimally the stresses affecting the individual laths 2 as a function of the individual assembly configurations of the shutter 1.

[0207] Furthermore, the use of hooks 4 for the mutual connection between the laths 2 ensures the presence of openings for the passage of air, as well as light, when the laths are positioned spaced apart along the stacking direction.

[0208] In the foregoing, the preferred embodiments have been described and variants of the present invention have been suggested, but it is to be understood that those skilled in the art will be able to make modifications and changes without thereby departing from the relative scope of protection, as defined by the claims attached.

Claims

1. Rolling shutter (1) configured to be connected to a winding roller (3) and to be slidably engaged along lateral support guides (5), wherein said rolling shutter (1) comprises a plurality of laths (2, 2') and of hooks (4), wherein each of said laths (2, 2') is movably connected to a following between said laths (2, 2') by at least two of said hooks (4), wherein each among said laths (2, 2') comprises a top portion (11) along which a first linear groove is delimited which longitudinally

extends along said lath (2, 2') along a first direction (7) and a bottom portion (12) along which a second linear groove is delimited which extends along said first direction (7) of said lath (2, 2'), wherein said hooks (4) are configured for slidably engage said first linear groove and said second linear groove, wherein each among said hooks (4) can be arranged along said first linear groove and said second linear groove in a predetermined position, said hooks (4) being arranged spaced to each other along said first direction (7), for the mutual connection of said laths (2, 2') stacked in succession and to allow a relative movement of approaching, moving away and rotation between said laths (2, 2').

2. Rolling shutter (1) according to claim 1, wherein said second linear groove is in communication with a channel (21) which develops internally to said lath (2, 2') along said first direction (7), wherein said first channel (21) is configured to slidably house at least a top portion of a respective one among said hooks (4) so as to allow the extraction or partially retraction of said top portion with respect to said bottom portion (12) through said second linear groove.

3. Rolling shutter (1) according to claim 2, wherein said lath (2, 2') is delimited by a first wall (8) and a second wall (9) connected to each other through at least a first partition (10), wherein said at least a first partition (10) delimits a top portion of said channel (21) configured to selectively act as abutment for a top portion of each of said hooks (4) which is slidably engaged in said channel (21).

4. Rolling shutter (1) according to any one of the preceding claims, wherein each of said hooks (4) is an extruded element ribbon-shaped and has a first hooking element (23) which protrudes from a bottom portion of each one among said hooks (4), a second hooking element (24) which extends from a top portion of each one among said hooks (4) and a central connection portion interposed between said top portion and said bottom portion.

5. Rolling shutter (1) according to claim 4, wherein said central connection portion is configured arched.

6. Rolling shutter (1) according to claim 4 or 5, wherein said first hooking element (23) is configured to achieve a shape coupling, in abutment, with a first curved element (14) which extends at said top portion (11) of said lath (2, 2') and wherein said second hooking element (24) is configured to achieve a shape coupling, in abutment, with a second curved element (15) which protrudes at said bottom portion (12) of said lath (2, 2').

7. Rolling shutter (1) according to claim 6, wherein said

first curved element (14) has a concavity facing the bottom portion (12) of said lath (2, 2') and wherein said second curved element (15) has a concavity facing said top portion (11) of said lath (2, 2').

8. Rolling shutter (1) according to claim 6 or 7, wherein said lath (2, 2') comprises a third curved element (19) at said bottom portion (12), wherein said third curved element (19) partially protrudes through a thickness of said lath (2, 2') opposed to said second curved element (15) and separated from it so as to delimit said second linear groove.
9. Rolling shutter (1) according to claim 8, wherein said third curved element (19) has a concavity facing said top portion (11) of said lath (2, 2') and it is configured to be selectively arranged in abutment against a third hooking element (26) which protrudes cantilevered from a top portion of said second hooking element (24) when one respective among said hooks (4) is engaged inclined relative to said lath (2, 2').
10. Rolling shutter (1) according to any one of the claims 6-9, wherein said lath (2, 2') comprises a second partition (16) at said top portion (11) spaced from said first curved element (14), wherein said second partition (16) is curved and has a concavity facing said top portion (11) and delimiting with said first curved element (14) a seat for housing said first hooking element (23) of a respective among said hooks (4).
11. Rolling shutter (1) according to any one of the preceding claims, comprising at least a connecting element (6) for the connection of first among said laths (2, 2') at said winding roller (3), wherein said at least one connecting element (6) has a length along said first direction (7) similar or comparable to that of said laths (2, 2') along said first direction (7).
12. Rolling shutter (1) according to any one of the preceding claims, comprising at least one gasket (31) configured elongated to be engaged, by means of shape coupling, along said first linear groove in a position interposed between pairs of said hooks (4) positioned along said first linear groove of a same lath among said laths (2, 2'), said at least one gasket (31) being configured to seal said first linear groove.
13. Rolling shutter (1) according to any one of claims 6-12, wherein said lath (2, 2') comprises a first protrusion (17) which protrudes from said top portion (11) on the opposite side with respect to that one from which said first curved element (14) departs, said first protrusion (17) extending along said lath (2, 2') along said first direction (7), and wherein said lath (2, 2') comprises a second protrusion (18) which protrudes from said first curved element (14) facing

the outside of said lath (2, 2'), said first protrusion (17) and said second protrusion (18) defining respective sides, parallel to each other, engageable, by means of shape coupling, against a respective seat delimited along said portion of bottom (12) of said lath (2, 2').

14. Rolling shutter (1) according to claims 7 and 8, wherein said second curved element (15) and said third curved element (19) are arranged spaced from the end of said bottom portion (12) to delimit said linear housing seat for housing said top portion (11) of a further lath (2, 2') against which it is configured to be selectively placed in abutment.

15. Kit of components for mounting a rolling shutter according to any one of claims 1 to 14, comprising:

- a plurality of laths (2, 2'), and
 - a plurality of hooks (4),
- wherein said laths (2, 2') are configured to be movably connected to each other by means of said hooks (4), wherein each of said laths (2, 2') comprises a top portion (11) along which a first linear groove extending longitudinally along said lath (2, 2') along a first direction (7) is delimited and a bottom portion (12) along which a second linear groove extending along said first direction of said lath (2, 2') is delimited, wherein said hooks (4) are configured to slidably engage said first linear groove and said second linear groove for the mutual connection of said lath (2, 2') stacked in succession with each other and for allowing a relative movement of approaching, moving away and rotating between said laths (2, 2').

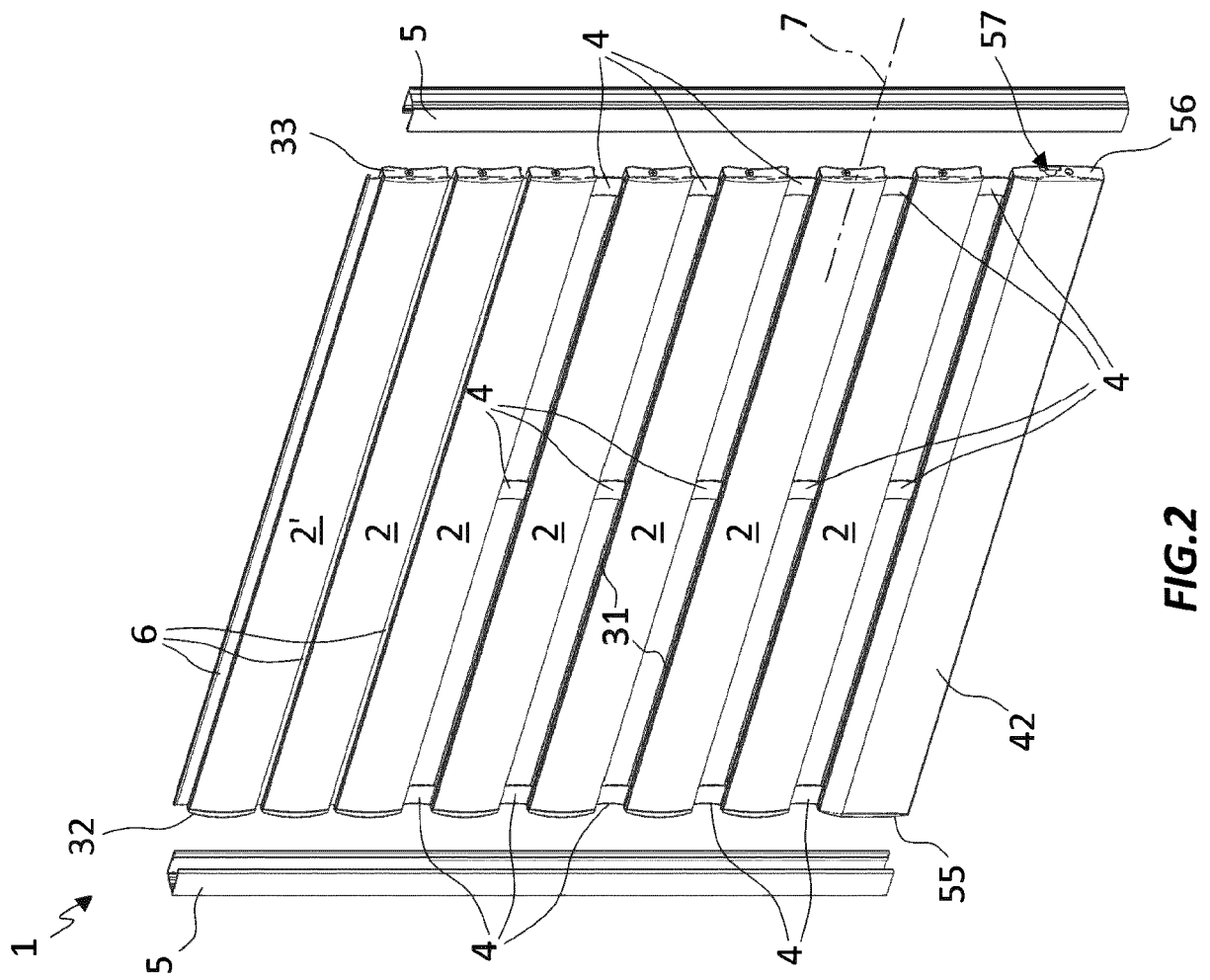


FIG.1

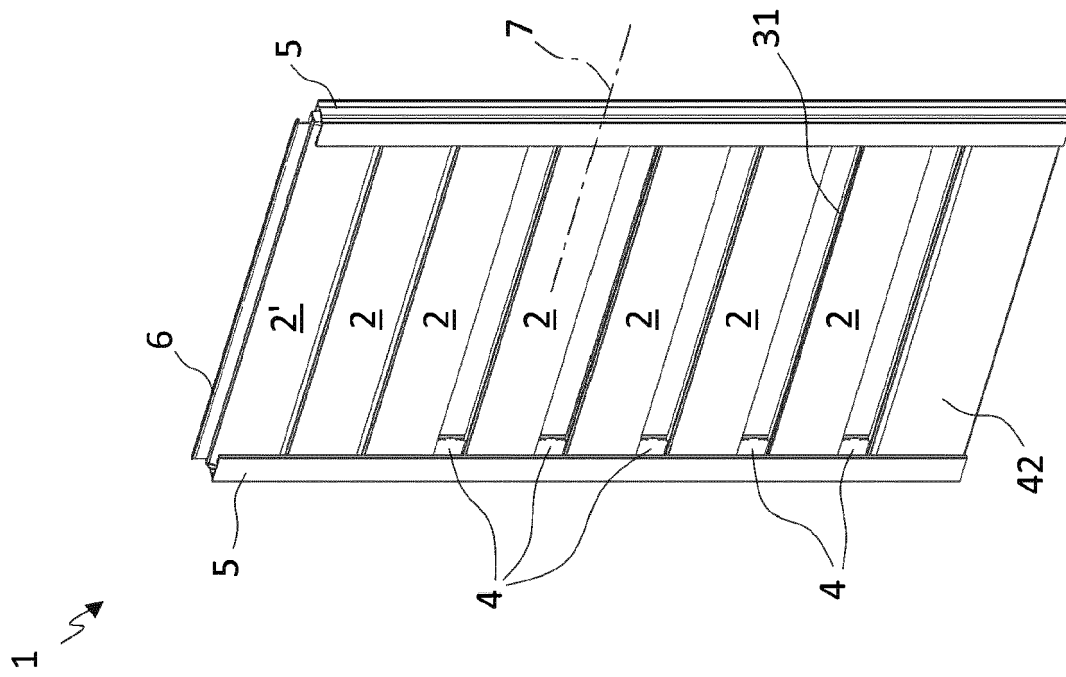


FIG.2

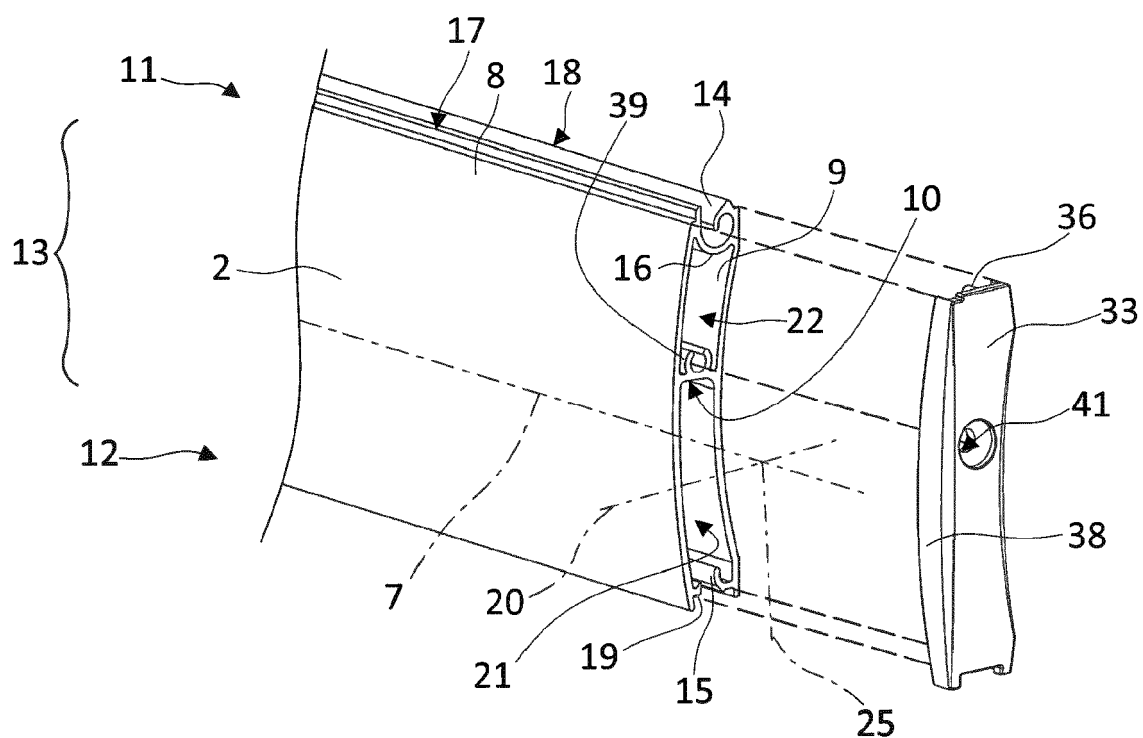


FIG. 3

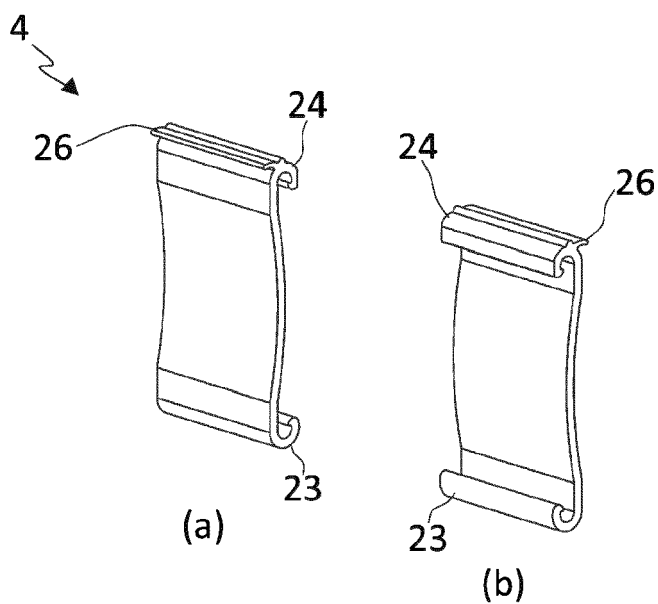


FIG. 4

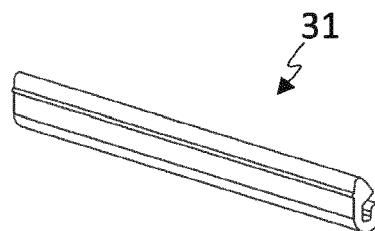


FIG. 5

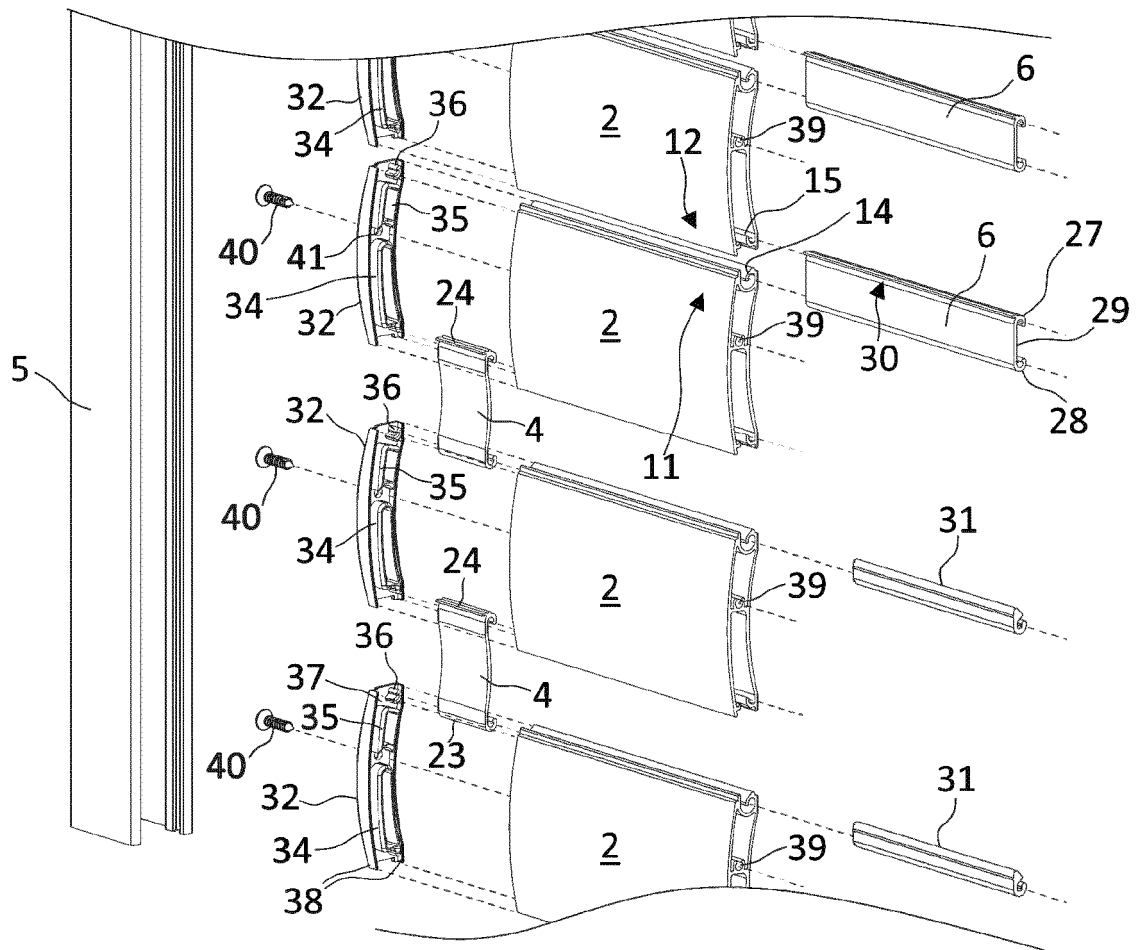


FIG. 6

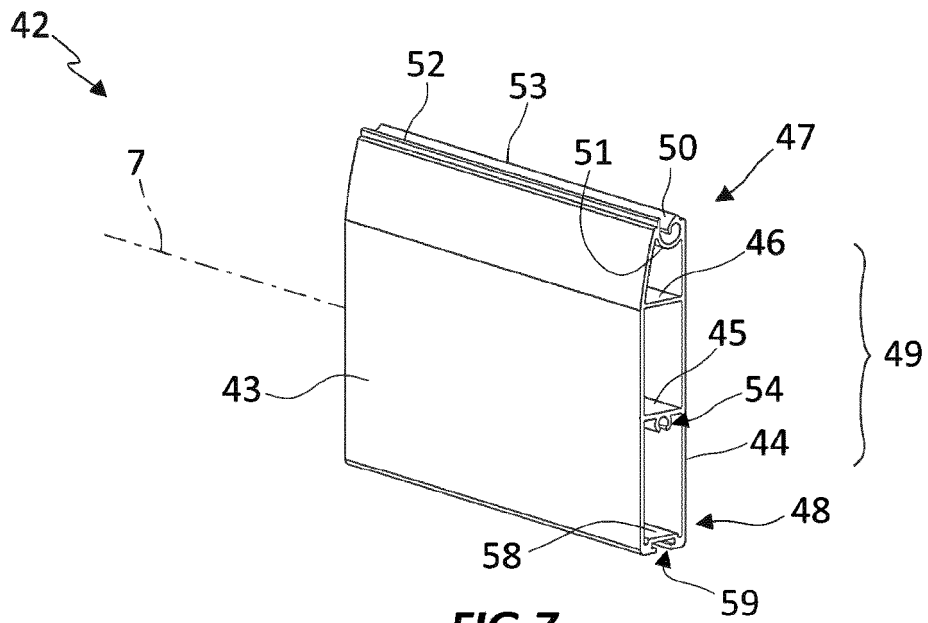


FIG. 7

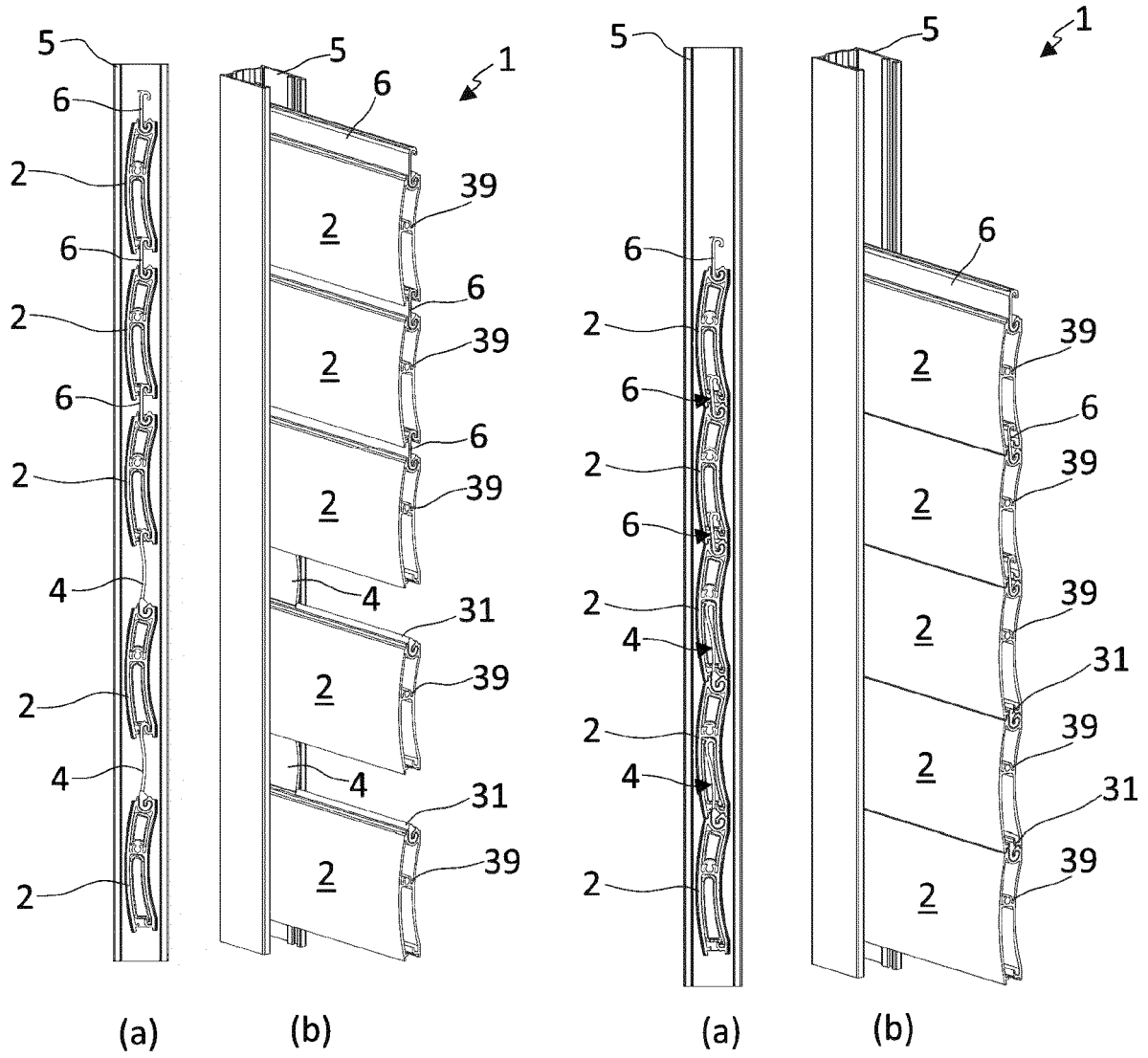


FIG. 8

FIG. 9

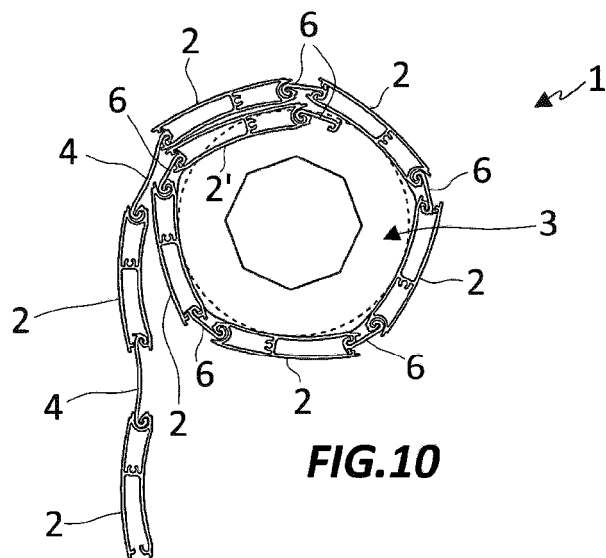


FIG. 10

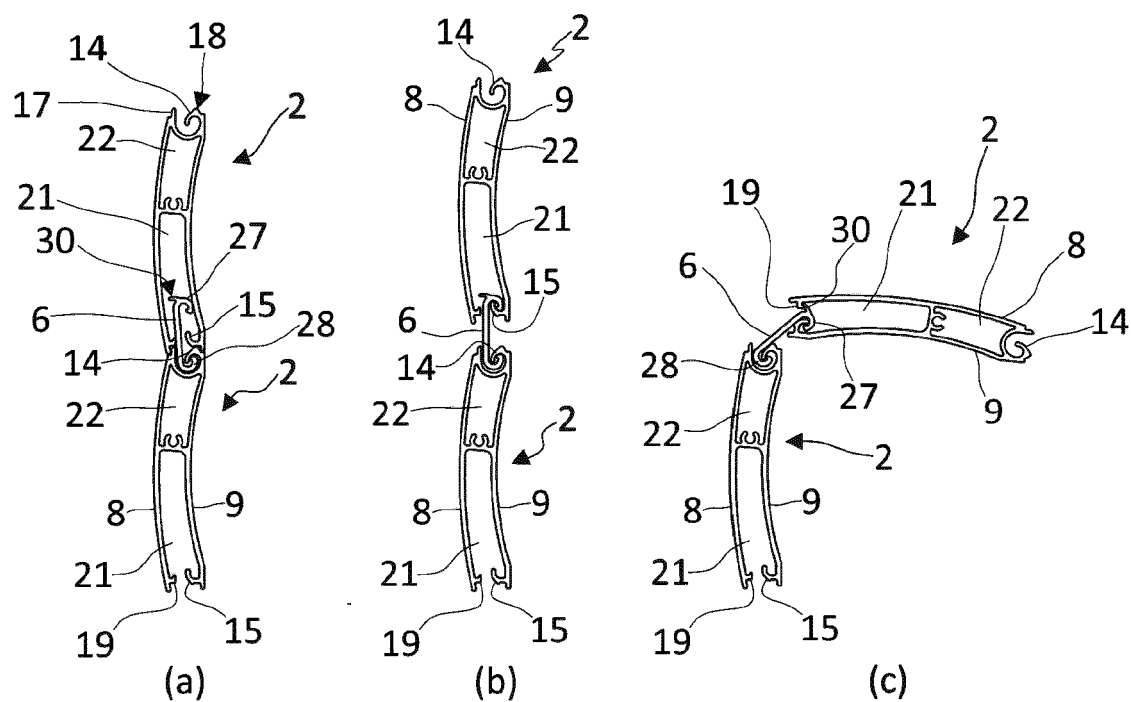


FIG. 11

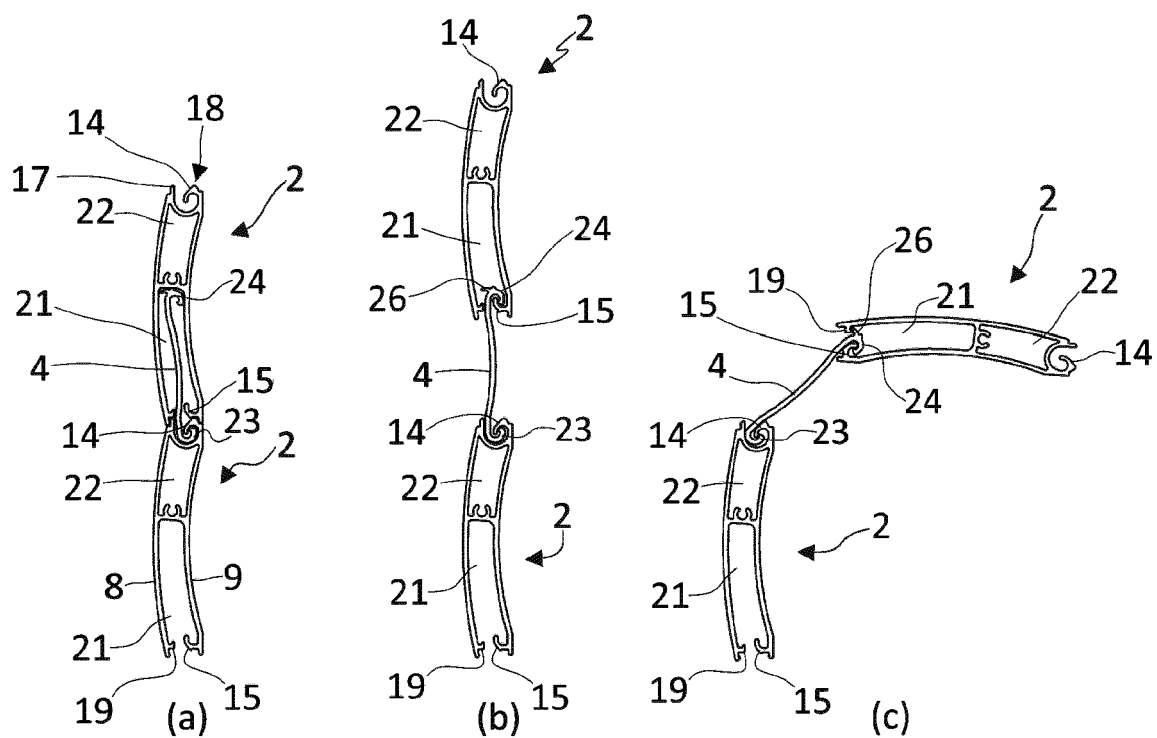


FIG. 12



EUROPEAN SEARCH REPORT

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			E06B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 1 June 2021	Examiner Altamura, Alessandra
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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01-06-2021

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