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(54) **SLAT FOR ROLLER SHUTTERS AND SHUTTER COMPRISING SAID SLAT**

(57) This invention relates to a slat (1) for roller shutters, comprising: - an internally hollow elongated body (10) extending in a longitudinal direction (X) and defining a coupling cavity (20) along a first longitudinal edge (11) thereof; and - a coupling appendage (30) extending from a second longitudinal edge (12), opposite the first edge (11), of said elongated body (10). The coupling appendage (30) consists of one or more profiled elements (31; 32, 33, 34), separate with respect to said elongated body, each of which is engaged on said elongated body (10) at a longitudinal engagement seat (13) which is made on said elongated body (10) along said second longitudinal edge (12). Each profiled element (31, 32, 33 and 34) protrudes from the elongated body (10) with a coupling portion 30a which protrudes from said longitudinal engagement seat (13). The slat (1) comprises one or more ventilation and lighting apertures that are defined by longitudinal slits (41) made on the coupling portions (30a) of said one or more profiled elements (31; 32, 33, 34) and/or by longitudinal spacings (42) between the coupling portions (30a) of two or more of said profiled elements (32, 33, 34). [Fig.6]

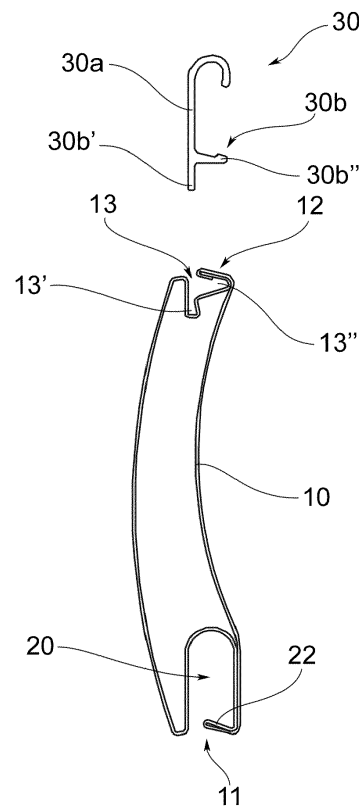


FIG.6

Description

Field of application

[0001] The subject of the present invention is a slat for roller shutters and a shutter comprising said slat.

Prior art

[0002] A roller shutter for windows and glass doors consists of a plurality of slats which are identical to each other and coupled to each other along respective longitudinal edges. The slats are shaped so as to be able to be mutually coupled to each other. The coupling zones are configured to allow partial rotation between the slats about the longitudinal direction. As a result of this freedom of rotation between the slats, the roller shutter is able to roll up on itself. In so doing, the roller shutter may be completely or partially raised by rolling one or more slats into a suitable container arranged above the window or glass door space, depending on the opening requirements of the space. A similar possibility exists when closing the space by lowering the shutter.

[0003] In general, as shown in Fig. 1, a traditional slat D consists of an elongated body E made of metal or plastics material, which body comprises a coupling appendage A extending along the whole of an upper longitudinal edge BS and a hollow seat C extending along the whole of a lower longitudinal edge BI. The coupling appendage A is made as one piece with the elongated body E. The hollow seat C and the coupling appendage A are shaped so as to allow mutual coupling. As shown in Fig. 4a-b, in an assembled shutter, the coupling appendage of a first slat is inserted in the hollow seat of a second slat arranged above, while the hollow seat of this first slat receives therein the coupling appendage of a third slat (not shown) arranged below.

[0004] As shown in Fig. 4a-b, the coupling appendage of a slat fits into the hollow seat of the above slat so as to be able to slide, in a direction Y transverse to the longitudinal direction X, between a position in which it is completely inserted in the hollow seat (Fig. 4a) and a position in which it is partially removed from the hollow seat (Fig. 4b). In this latter position, the coupling appendage still connects the two slats together, but is free to rotate with respect to the hollow seat, allowing mutual rotation between the slats (Fig. 4c) and thus allowing the shutter to roll up.

[0005] As shown in Fig. 4b, when the shutter is not completely lowered, the slats arranged vertically tend to separate from each other as a result of gravity, thus making the coupling appendages slide into the position in which they are partially removed from the hollow seat. In these situations, most of the transverse extension of the coupling appendages A therefore protrudes from the respective hollow seats C.

[0006] Generally in the coupling appendages A the slats have a plurality of longitudinal slits F, which slits

allow minimal air circulation and minimal light ingress even when the shutter occupies the entire span of the space but is not totally unrolled.

[0007] As already stated, a traditional slat consists of an elongated body which may be made of a metal material or plastics material. If the elongated body is made of a metal material, it is made by bending and profiling a metal sheet. In this case, the longitudinal ventilation and lighting slits are made by means of punching. Considering the reduced dimensions of the coupling appendages and the fact that the appendages themselves are defined by two overlapping portions of sheet metal, this operation may be difficult and does not always lead to satisfactory aesthetic results.

[0008] In the roller shutter manufacturing sector, there is therefore a need to provide a slat which makes it possible to simplify the creation of the ventilation and lighting slits in the coupling appendages.

Disclosure of the invention

[0009] Therefore, the main object of this invention is to completely or partly eliminate the disadvantages of the aforementioned prior art by providing a slat for roller shutters that allows the ventilation and lighting slits in the coupling appendages to be created in a simpler manner.

[0010] A further object of this invention is to provide a slat for roller shutters that is simple and cost-effective to produce.

Brief description of the drawings

[0011] The technical features of the invention, according to the aforesaid objects, may clearly be seen in the content of the claims below, and its advantages will become more readily apparent in the detailed description that follows, made with reference to the accompanying drawings which illustrate one or more purely illustrative and non-limiting embodiments thereof, in which:

- Fig. 1 is a cross-sectional view of a traditional slat for roller shutters;
- Fig. 2 and 3 are two perspective views of the slat in Fig. 1;
- Fig. 4a, 4b and 4c show two slats of Fig. 1 coupled with each other and shown in three different operating positions;
- Fig. 5 is a cross-sectional view of a slat for roller shutters according to a preferred embodiment of this invention;
- Fig. 6 is an exploded view of the slat shown in Fig. 5;
- Fig. 7a, 7b and 7c show two slats of Fig. 5 coupled with each other and shown in three different operating positions;
- Fig. 8 is an orthogonal front view of a slat for roller shutters according to an embodiment of this invention in which the coupling appendage of the slat consists of a single profiled element;

- Fig. 9 is an orthogonal front view of a slat for roller shutters according to an embodiment of this invention in which the coupling appendage of the slat consists of two or more separate profiled elements spaced apart from each other; and
- Fig. 10 and 11 are two perspective views of the slat in Fig. 8 and Fig. 9, respectively.

Detailed description

[0012] The slat 1 for roller shutters according to the invention has been indicated as a whole by reference sign 1 in the accompanying figures.

[0013] Herein and in the following description and claims, reference will be made to the slat 1 in an assembled condition inside a shutter. Therefore, any references to a lower or upper position or to a horizontal or vertical orientation should be interpreted in this sense.

[0014] According to a general embodiment of the invention, the slat 1 for roller shutters comprises:

- an internally hollow elongated body 10 which extends in a longitudinal direction X and defines a coupling cavity 20 along a first longitudinal edge 11 thereof; and
- a coupling appendage 30 which extends from a second longitudinal edge 12, opposite the first edge 11, of said elongated body 10.

[0015] As shown in Fig. 7a, 7b and 7c, the coupling cavity 20 is intended to be engaged by the coupling appendage 30 of a first slat identical to said slat 1, while the coupling appendage 30 is intended to engage the coupling cavity 20 of a second slat (not shown in the figures) identical to said slat 1.

[0016] More specifically, the coupling cavity 20 is designed to define, with a coupling appendage 30, an articulated coupling, wherein the coupling appendage 30 is free to slide inside said cavity 20 in a direction Y transverse to said longitudinal direction X (see Fig. 7a and 7b) and to rotate at least partially about said longitudinal direction (see Fig. 7b and 7c).

[0017] In particular, as shown in the accompanying figures, the coupling cavity 20 is defined by a chamber which extends from the first longitudinal edge 11 toward the second longitudinal edge 12 of the elongated body 10 in the aforesaid transverse direction Y. At the first edge 11, the chamber is partially closed by a bottom wall 22 which delimits a longitudinal aperture 21. The coupling appendage 30 extends from the elongated body 10 with a free hook-shaped end (in the following also referred to as a coupling portion 30a). In the assembled condition, the free hook-shaped end is inserted into the coupling cavity 20 and is free to slide inside the chamber by passing through the aforesaid longitudinal aperture 21. The free hook-shaped end is dimensioned such that it does not fit through the longitudinal opening 21, and such that it engages the bottom wall of the chamber. The latter acts

as an end stop, preventing the coupling appendage 30 from completely leaving the coupling cavity, and at the same time defines the center of rotation of the articulated coupling (see Fig. 7b and 7c).

[0018] According to the invention, the coupling appendage 30 consists of one or more profiled elements 31, 32, 33, 34 which are separate with respect to the elongated body 10.

[0019] Each of these one or more profiled elements 31, 32, 33, 34 is engaged on said elongated body 30 at a longitudinal engagement seat 13 which is made on the elongated body 10 along said second longitudinal edge 12. Each profiled element 31, 32, 33 and 34 protrudes from the elongated body 10 with a coupling portion 30a which protrudes from said longitudinal engagement seat 13.

[0020] According to the invention, the slat 1 comprises one or more ventilation and lighting apertures that are defined by:

- longitudinal slits 41 made on the coupling portions 30a of said one or more profiled elements 31, 32, 33, 34; and/or
- longitudinal spacings 42 between the coupling portions 30a of two or more of said profiled elements 32, 33, 34.

[0021] Due to the fact that the coupling appendage 30 of the slat consists of one or more elements which are separate with respect to the elongated body 10 (i.e. not made as one piece therewith), it is possible to simplify the production of the ventilation and lighting apertures on the slat.

[0022] In fact, these apertures may be made by making holes on the single profiled element or on multiple profiled elements that form the coupling appendage, which elements are separate from the elongated body. This avoids production complications from making the holes in the elongated body that forms the coupling appendage.

[0023] Alternatively and/or in combination, in the case where the coupling appendage 30 consists of two or more profiled elements, these apertures may be defined without making holes in the profiled elements, and instead simply by spacing these profiled elements apart from each other. This mode of realization not only makes it possible to eliminate the step of making the holes, but also ensures greater operational flexibility, since the dimensions of the ventilation/lighting apertures may be defined simply by the dimensions of the profiled elements and the respective spacings.

[0024] In this latter case, it is also possible to increase the overall span of the ventilation/lighting apertures without weakening the coupling appendage.

[0025] According to a first embodiment shown in Fig. 8 and 10, the coupling appendage 30 consists of a single profiled element 31 which has a longitudinal extension substantially equivalent to the longitudinal extension of the elongated body 30. The ventilation and lighting ap-

ertures are defined by a plurality of longitudinal slits 41 made on the coupling portion 30a of said single profiled element 31.

[0026] Advantageously the aforesaid longitudinal slits 41 are distributed, preferably uniformly, along the longitudinal extension of said single profiled element 41.

[0027] According to a second embodiment shown in Fig. 9 and 11, the coupling appendage 30 consists of two or more separate profiled elements 32, 33, 34 which are arranged at positions spaced apart from each other along said longitudinal engagement seat 13. In so doing, a free space and longitudinal spacing is defined between two profiled elements 32, 33 and 33, 34. The ventilation and lighting apertures are defined by the longitudinal spacings 42 present between the coupling portions 30a of two or more of said profiled elements 32, 33, 34.

[0028] Advantageously the aforesaid longitudinal spacings 42 are distributed, preferably uniformly, along the longitudinal extension of said elongated body 41.

[0029] According to an embodiment which is not shown, in the case where the coupling appendage 30 consists of two or more separate profiled elements 32, 33, 34 spaced apart from each other, the ventilation and lighting apertures may be defined not only by the longitudinal spacings 42 but also by a plurality of longitudinal slits made on the coupling portions 30a of two or more of said profiled elements 32, 33, 34.

[0030] Preferably, as shown in Fig. 9 and 11, in the case where the coupling appendage 30 consists of two or more separate profiled elements 32, 33, 34 spaced apart from each other, the ventilation and lighting apertures are defined only by the longitudinal spacings 42 present between the coupling portions 30a of two or more of said profiled elements 32, 33, 34.

[0031] According to a preferred embodiment shown in particular in Fig. 5 and 6, each of said one or more profiled elements 31, 32, 33, 34 comprises an engagement base 30b at which the profiled element 31, 32, 33, 34 is engaged inside said longitudinal seat 13. The coupling portion 30a extends from said engagement base 30b. This engagement base 30b is preferably defined by two wings 30b' and 30b'' which are angled with each other and are inserted in two respective branches 13' and 13'' of said longitudinal seat 13, which branches are counter-shaped with respect to said two wings. In particular, with reference to a sectional plane orthogonal to the longitudinal direction X, a first wing 30b' (with the respective seat branch 13') extends along the transverse direction Y, while a second wing 30b'' (with the respective seat branch 13'') extends orthogonally to said first wing 30b'. This configuration makes it possible to create a coupling between the engagement base 30b and longitudinal seat 13 that is more resistant to torsional strains, thus making the engagement of the coupling appendage 30 on the elongated body 10 more stable over time.

[0032] According to a preferred embodiment, each of said one or more profiled elements 31, 32, 33, 34 consists of an extruded body, preferably made of metal.

[0033] According to an alternative embodiment, each of said one or more profiled elements 31, 32, 33, 34 consists of a portion of sheet metal which is bent and profiled.

[0034] The elongated body 10 preferably consists of a box-shaped body made by bending and profiling a metal sheet.

[0035] The subject of the present invention is also a roller shutter comprising a plurality of slats coupled with each other in pairs. Each of said slats is a slat 1 according to the invention, and in particular as described above.

[0036] The invention achieves numerous advantages, some of which have already been described.

[0037] The slat 1 for roller shutters according to the invention makes it possible for the ventilation and lighting apertures in the coupling appendages to be created in a simpler manner.

[0038] The slat 1 for roller shutters according to the invention is also simple and cost-effective to produce.

[0039] The invention thus conceived therefore achieves its intended objects.

[0040] Obviously, in its practical embodiment, it may also assume forms and configurations different from the one shown above without thereby departing from the present scope of protection.

[0041] Moreover, all of the details may be replaced by technically equivalent elements, and the dimensions, the forms and the materials employed may be of any kind, depending on the needs.

Claims

1. Slat (1) for roller shutters, comprising:

- an internally hollow elongated body (10) extending in a longitudinal direction (X) and defining a coupling cavity (20) along a first longitudinal edge (11) thereof;
- an engagement appendage (30), extending from a second longitudinal edge (12), opposite the first edge (11), of said elongated body (10),

said coupling cavity (20) being intended to be engaged by the coupling appendage (30) of a first slat identical to said slat (1), said coupling appendage (30) being intended to engage the coupling cavity (20) of a second slat identical to said slat (1),

wherein said coupling cavity (20) is configured to define with a coupling appendage (30) an articulated coupling, wherein said coupling appendage (30) is free to slide inside said coupling cavity (20) in a direction transverse to said longitudinal direction (X) and to rotate at least partially about said longitudinal direction,

characterised in that said coupling appendage (30) consists of one or more profiled elements (31; 32, 33, 34), separate with respect to said

- elongated body, each of which is engaged on said elongated body (10) at a longitudinal engagement seat (13) which is made on said elongated body (10) along said second longitudinal edge (12), each profiled element (31, 32, 33 and 34) protruding from said elongated body (10) with a coupling portion (30a), which protrudes from said longitudinal engagement seat (13), and **in that** it comprises one or more ventilation and lighting apertures that are defined by longitudinal slits (41) made on the coupling portions (30a) of said one or more profiled elements (31; 32, 33, 34) and/or by longitudinal spacings (42) between the coupling portions (30a) of two or more of said profiled elements (32, 33, 34) .
2. The slat according to claim 1, wherein said coupling appendage (30) consists of a single profiled element (31) having a longitudinal extension substantially equivalent to the longitudinal extension of said elongated body (30) and wherein said ventilation and lighting apertures are defined by a plurality of longitudinal slits (41) made on the coupling portion (30a) of said single profiled element (31).
 3. The slat according to claim 2, wherein said longitudinal slits (41) are distributed, preferably uniformly, along the longitudinal extension of said single profiled element (41).
 4. The slat according to claim 1, wherein said coupling appendage (30) consists of two or more separate profiled elements (32, 33, 34), which are arranged at positions spaced apart from each other along said longitudinal engagement seat (13) and wherein said ventilation and lighting apertures are defined by longitudinal spacings (42) present between the coupling portions (30a) of two or more of said profiled elements (32, 33, 34).
 5. The slat according to claim 4, wherein said longitudinal spacings (42) are distributed, preferably uniformly, along the longitudinal extension of said elongated body (41).
 6. The slat according to claim 4 or 5, wherein said ventilation and lighting apertures are also defined by a plurality of longitudinal slits (41) made on the engagement portions (30a) of two or more of said profiled members (32, 33, 34).
 7. The slat according to claim 4 or 5, wherein said ventilation and lighting apertures are defined only by the longitudinal spacings (42) present between the coupling portions (30a) of two or more of said profiled elements (32, 33, 34).
 8. The slat according to any of the preceding claims, wherein each of said one or more profiled elements (31; 32, 33, 34) comprises an engagement base (30b) at which said profiled element (31; 32, 33, 34) is engaged inside said longitudinal seat (13) and from which the engagement portion (30a) extends, and wherein said engagement base (30b) is defined by two wings (30b'; 30b'') angled with each other which are engaged in two respective counter-shaped branches (13', 13'') of said longitudinal seat (13).
 9. The slat according to any of the preceding claims, wherein each of said one or more profiled elements (31; 32, 33, 34) consists of an extruded body, preferably metal.
 10. The slat according to any of the claims from 1 to 8, wherein each of said one or more profiled elements (31; 32, 33, 34) consists of a portion of sheet metal, bent and profiled.
 11. The slat according to any of the preceding claims, wherein said elongated body (10) consists of a box-shaped body made by bending and profiling a metal sheet.
 12. Roller shutter, comprising a plurality of slats engaged with each other in pairs, **characterised in that** each of said slats is a slat (1) according to any one of the preceding claims.

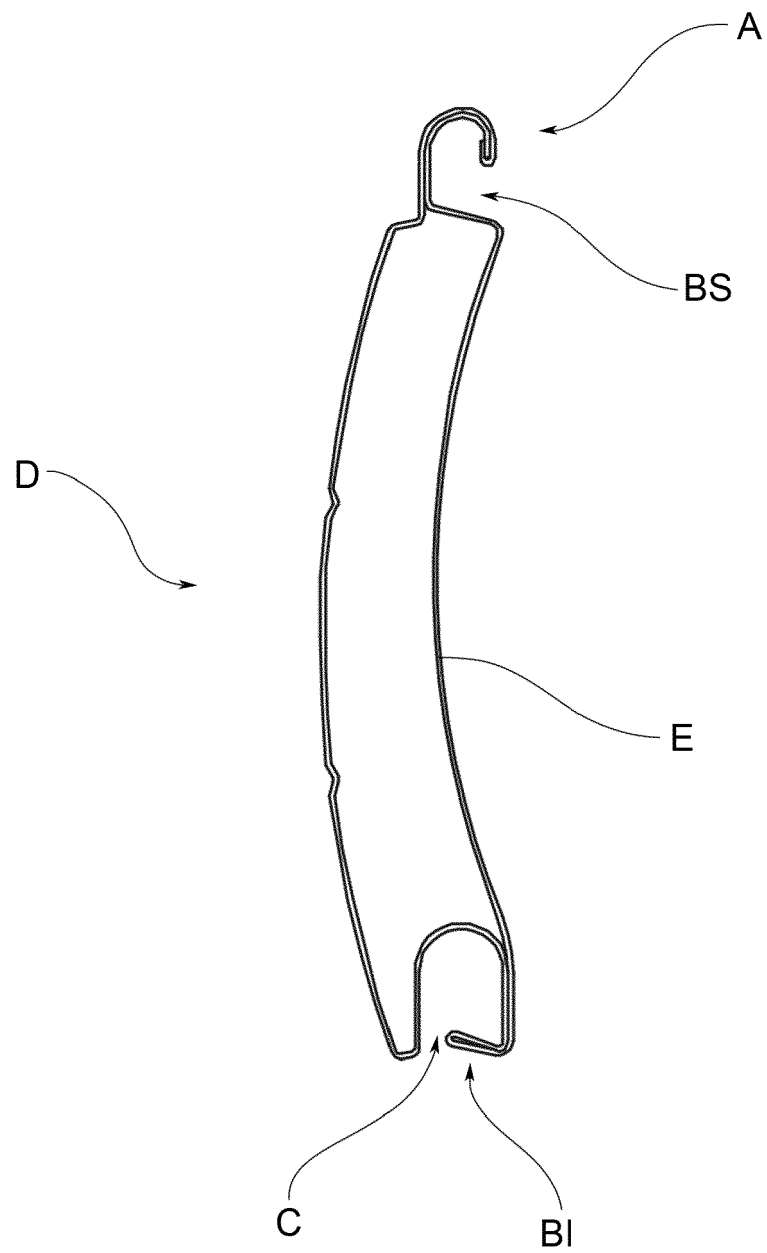


FIG.1

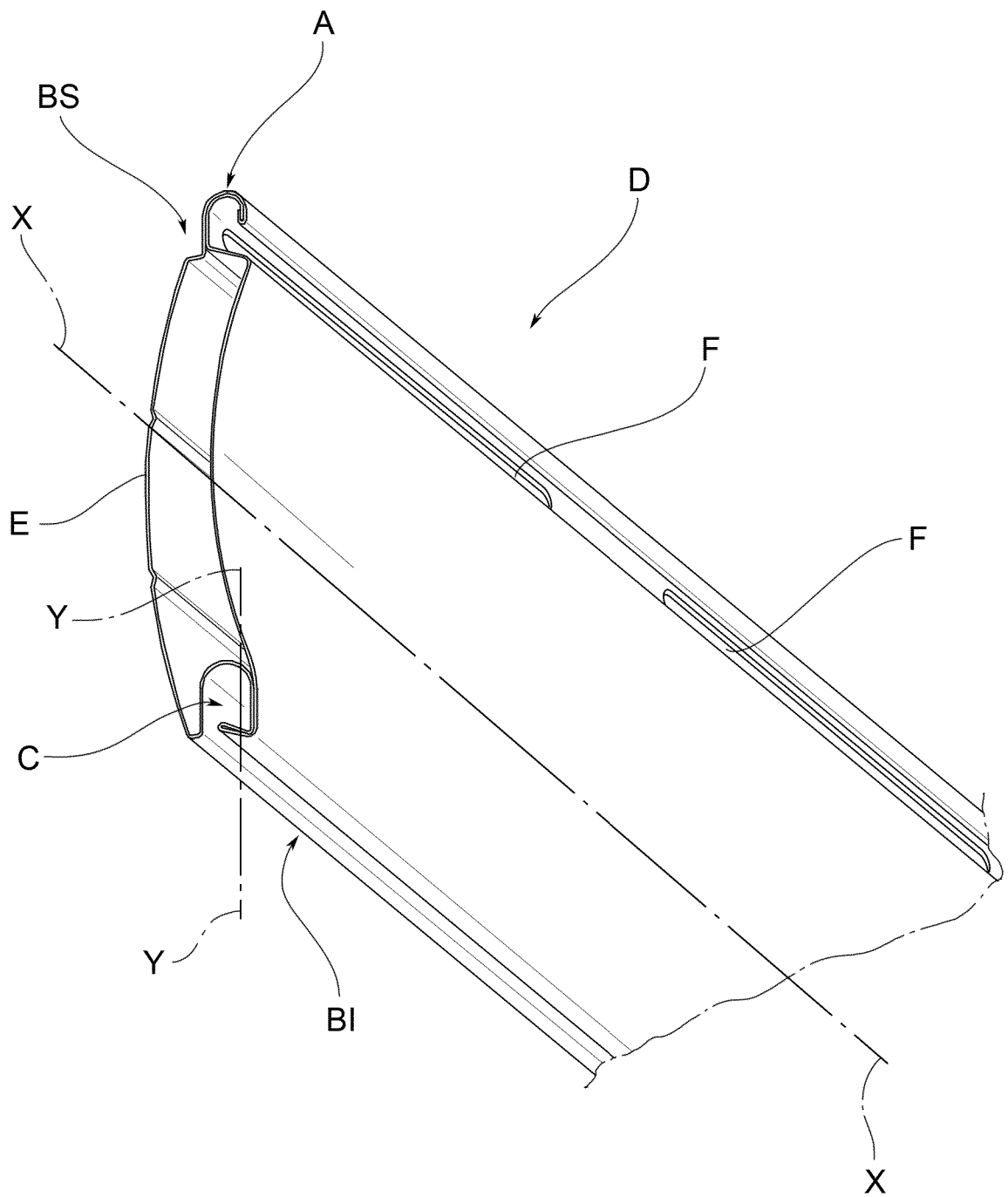


FIG.2

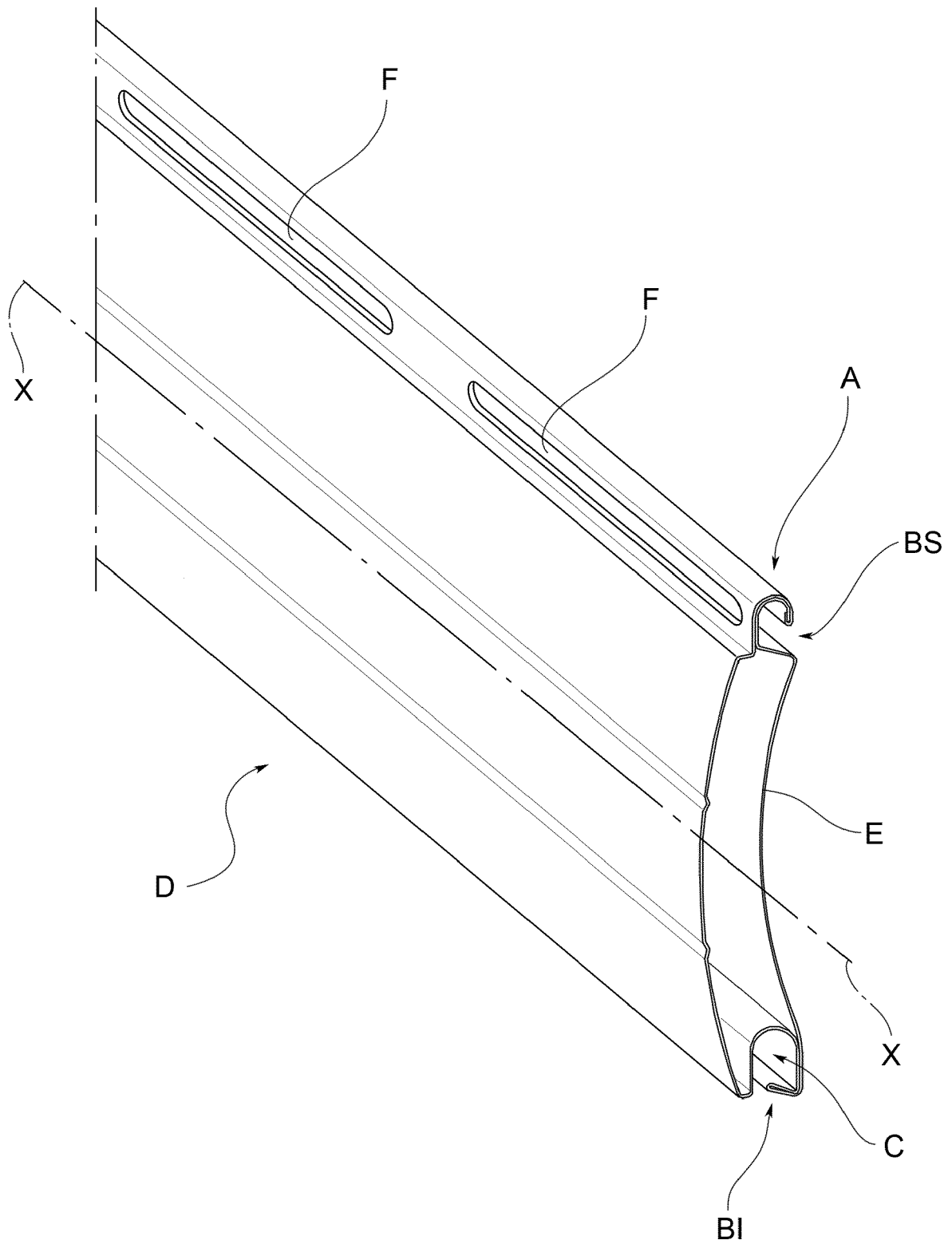
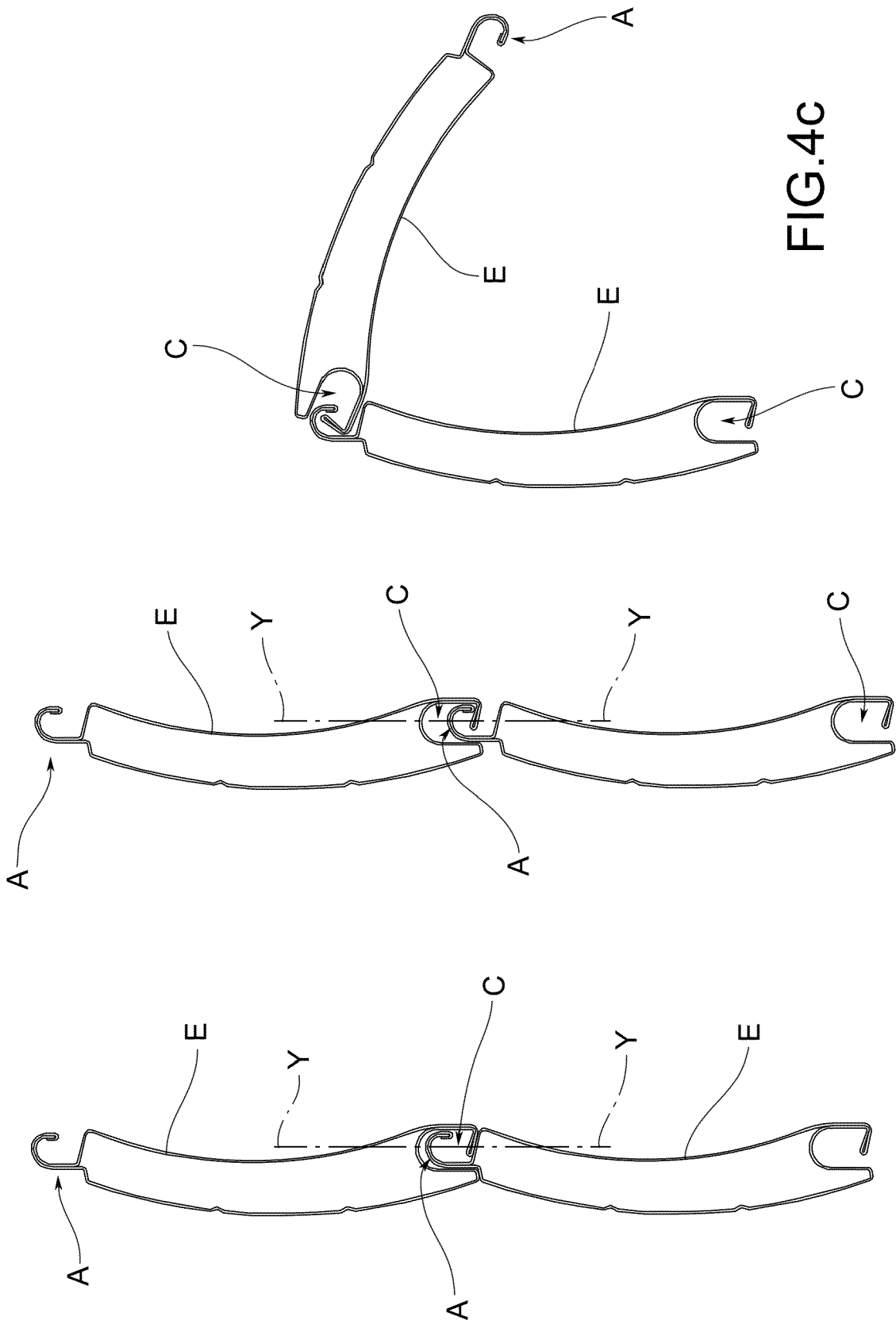


FIG.3



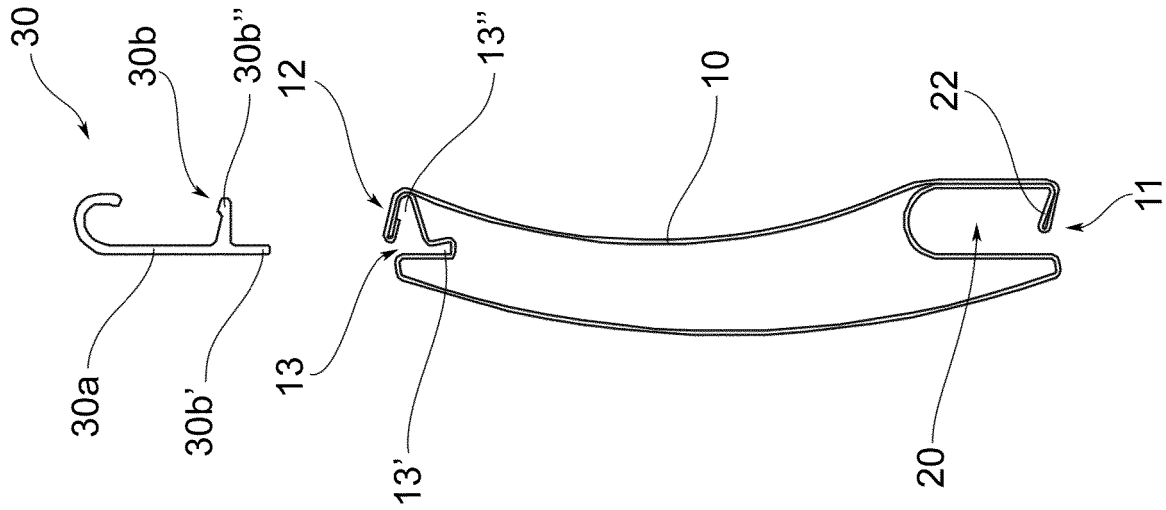


FIG. 5

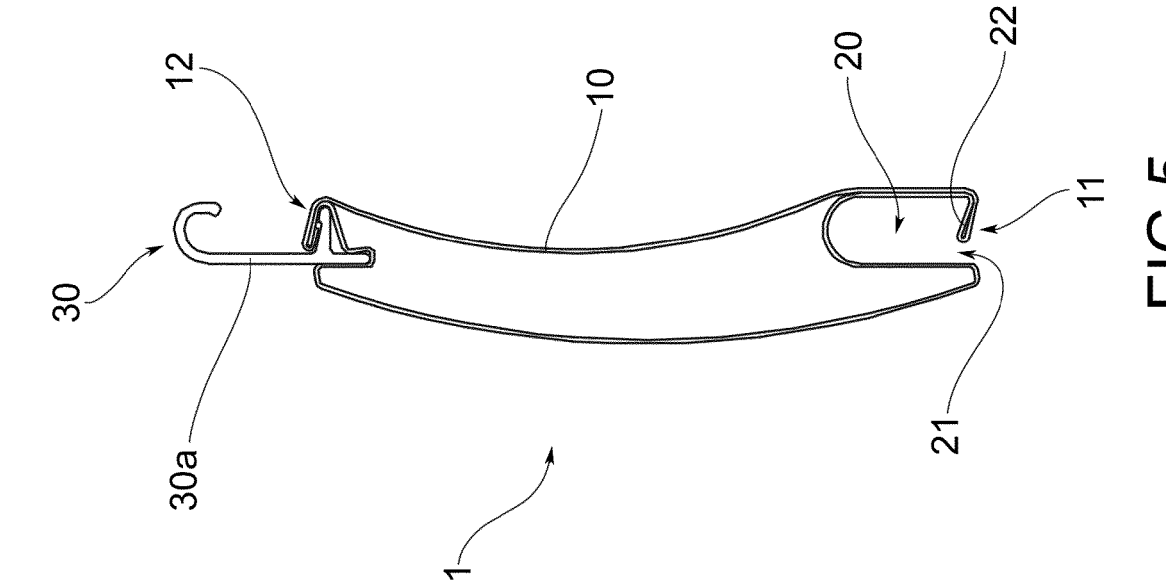


FIG. 6

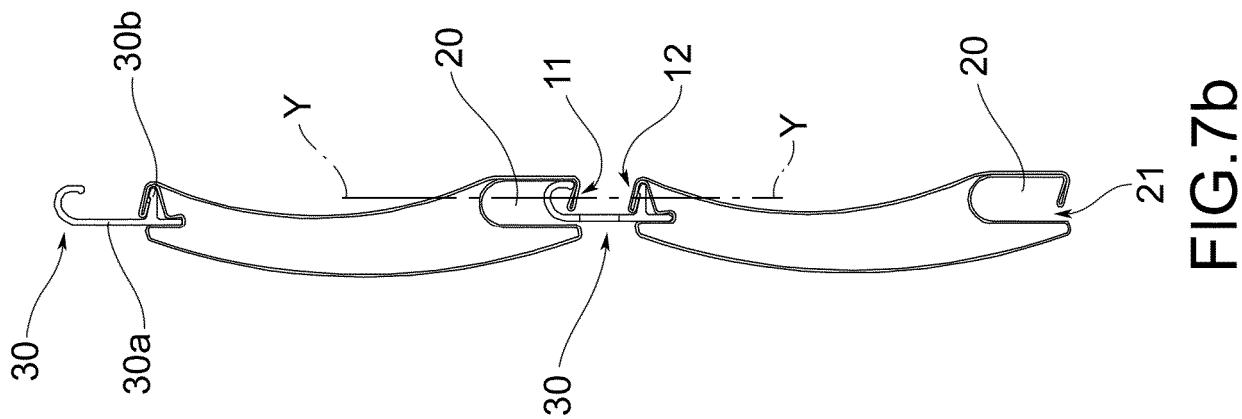


FIG. 7b

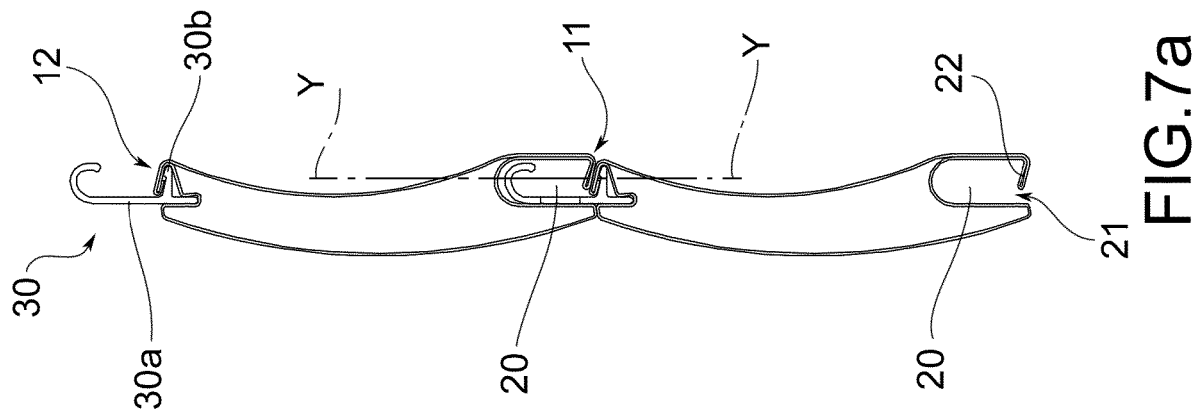


FIG. 7a

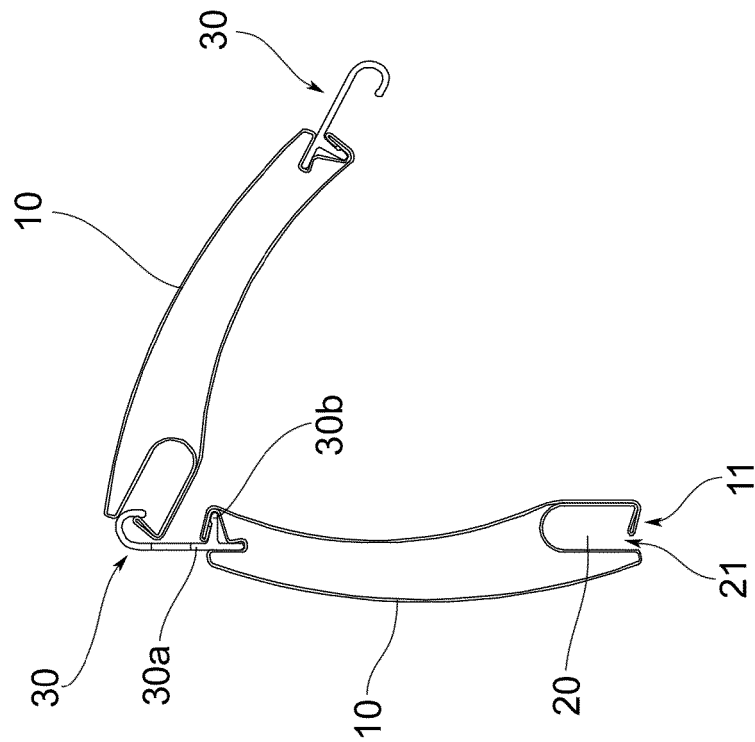


FIG. 7c

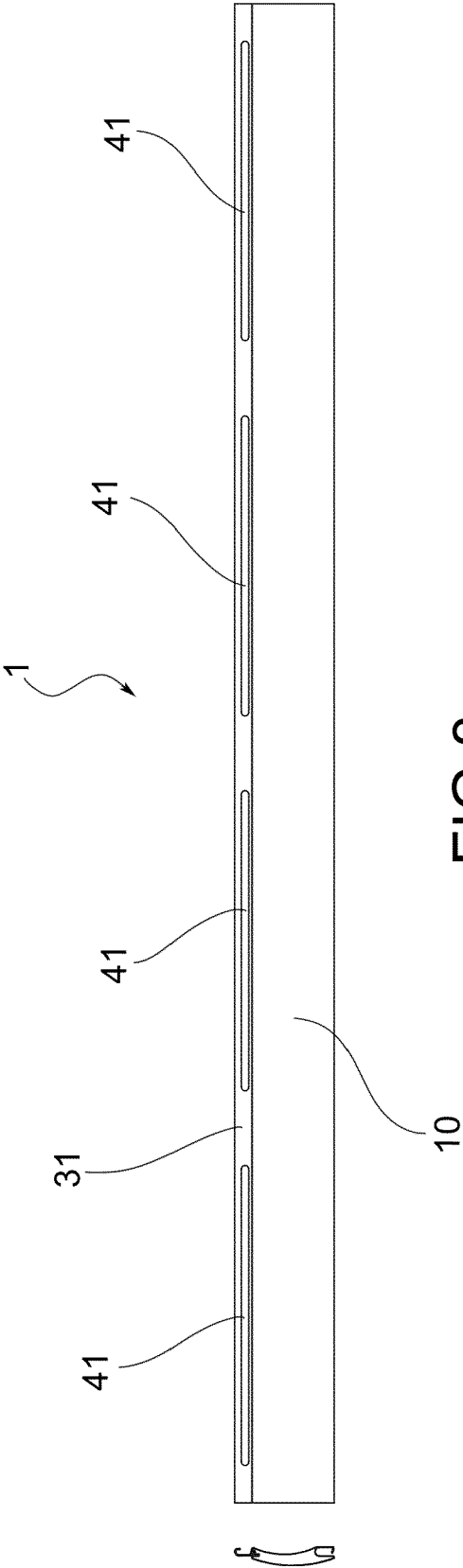


FIG. 8

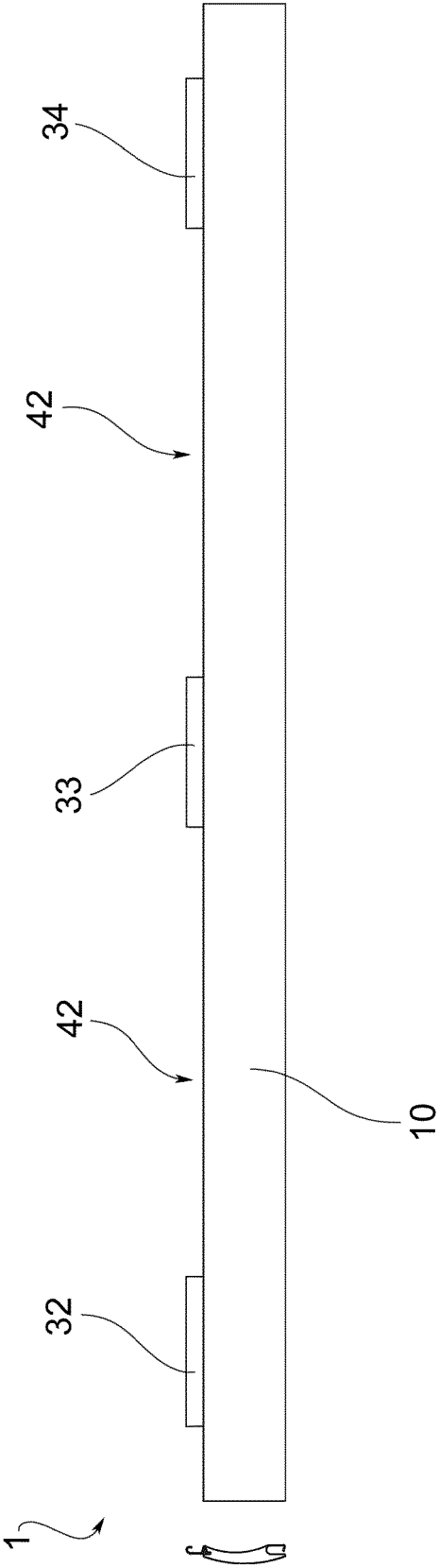


FIG. 9

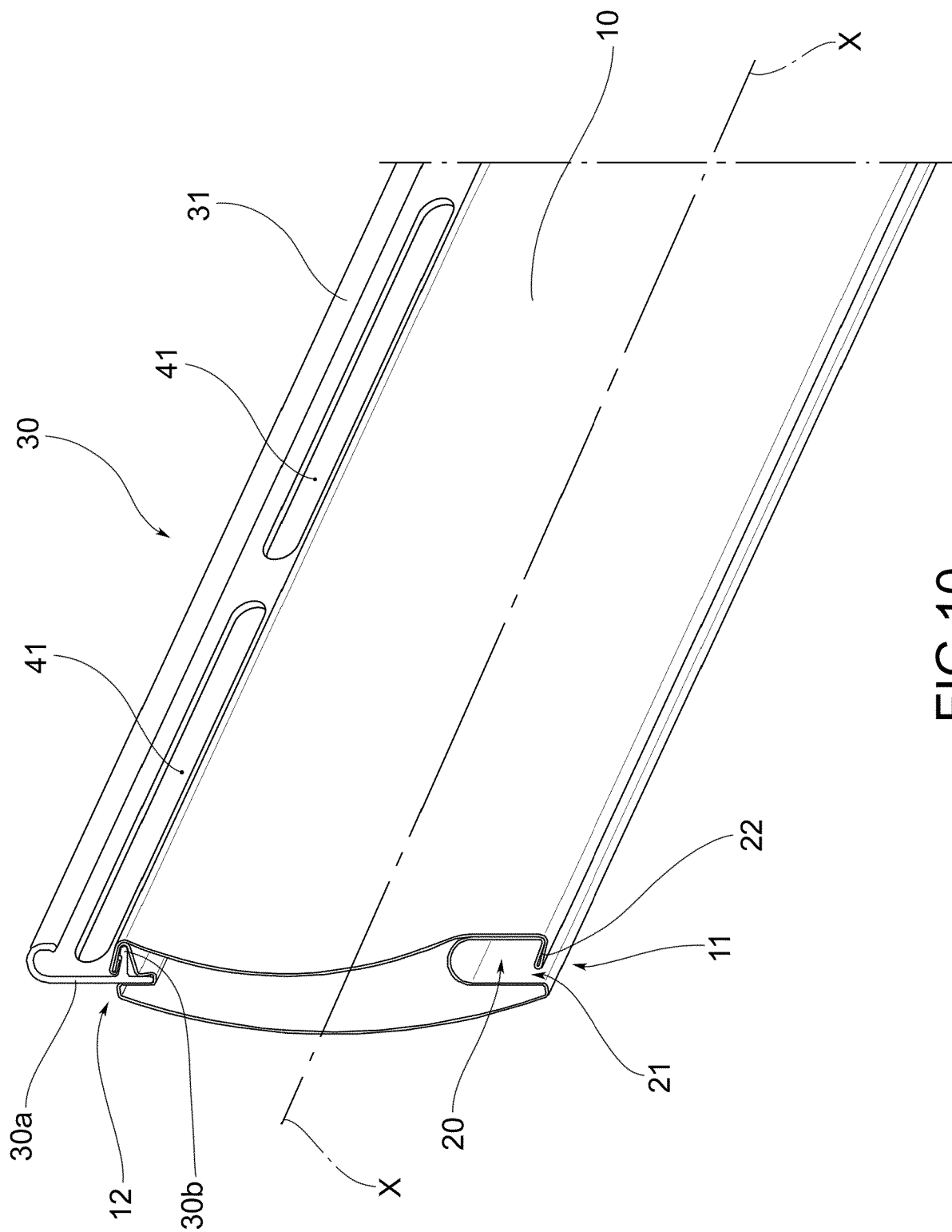


FIG.10

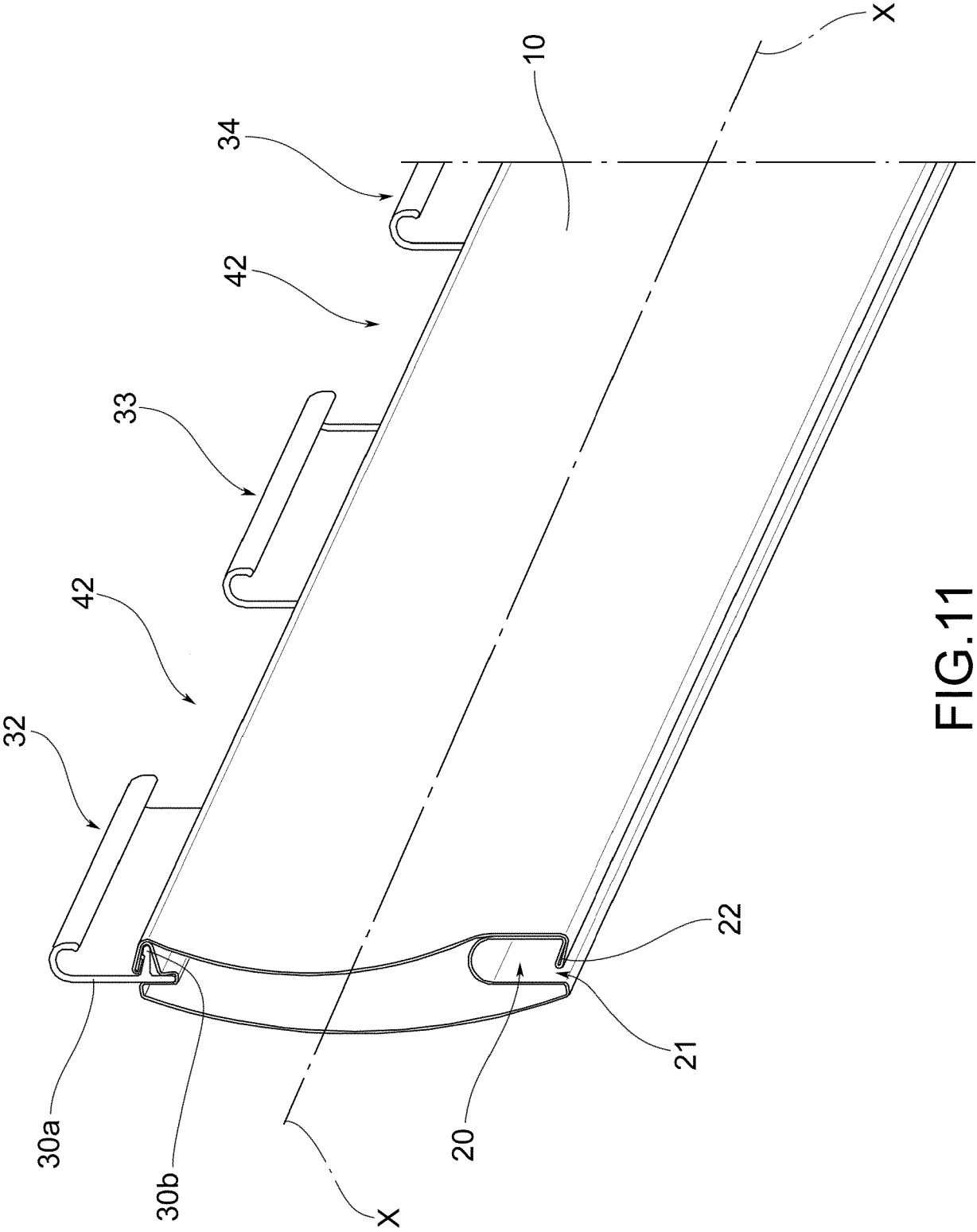


FIG.11



EUROPEAN SEARCH REPORT

Application Number

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EUROPEAN SEARCH REPORT

Application Number

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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