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

(57) The present invention relates to a slat (1) for rolling shutters, defined by the coupling of two elongated bodies (10, 20), both of which extend along a longitudinal direction (X) of the slat (1). A first elongated body (10) is made of a first material and defines the outer face (2) of the slat. A second elongated body (20) is made of a second material having a lower coefficient of thermal conductivity than the first material and defines an outer face (3) of the slat. The slat (1) comprises a coupling appendage (4), formed at an upper longitudinal edge (6) of the slat, and a coupling cavity (5), formed at a lower longitudinal edge (7) of the slat. The coupling appendage (4) is defined entirely by the first elongated body (10). The coupling cavity (5) is delimited in part by said first elongated body (10) and in part by said second elongated body (20).

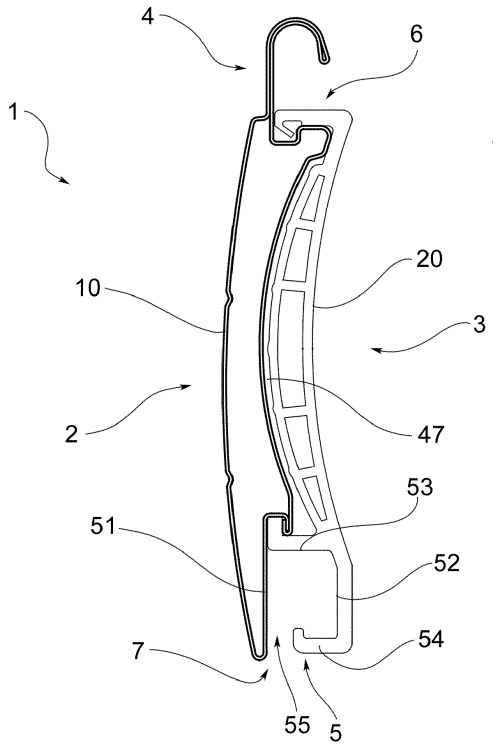


FIG.5

EP 4 080 009 A1

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. Due to this freedom of rotation between the slats, the roller shutter may roll up on itself. In so doing, the roller shutter may be completely or partially raised or lowered 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.

[0003] In general, as shown in Fig. 1, a traditional slat D consists of an elongated body E, which body defines 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 hollow seat C and the coupling appendage A are shaped so as to allow mutual coupling.

[0004] More specifically, as shown in Fig. 2a-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 said first slat receives therein the coupling appendage of a third slat (not shown) arranged below. The coupling appendage of a slat fits into the hollow seat of the upper slat so as to be able to slide, in a direction Y, transverse to the longitudinal direction X, (orthogonal to the sheet in the accompanying figures) between a position in which it is completely inserted in the hollow seat (Fig. 2a) and a position in which is it partially removed from the hollow seat (Fig. 2b). 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. 2c) and thus allowing the shutter to roll up.

[0005] Generally, the elongated body E that defines a traditional type of slat D is made of metallic material. The elongated body E defines internally a cavity that is filled with polymeric material, e.g., polyurethane foam. This filling serves to mechanically strengthen the slat, while also acting as thermal insulation. Despite said thermal insulation, metal slats have poor thermal insulation capabilities. In fact, the metal structure of the slat acts as a thermal bridge between the external environment and the internal environment. The inner face of the slat (i.e., the one facing the inside of the compartment) is in fact thermally connected to the external face of the slat (i.e., the one facing the outside of the compartment).

[0006] In order to improve the thermal insulation capacity of shutters with metal slats, it was proposed to apply a coating of polymeric material on the inner face of the slats.

[0007] Such a slat D1 is described, for example, in the Italian Utility Model No. 202016000042116. More specifically, as shown in Fig. 3 and 4 taken from said utility model, a slat D1 comprises a main elongated body E1 made of metallic material, having an internally hollow box structure intended to be filled with polymeric material, e.g., polyurethane foam. The main elongated body E1 defines, along its upper longitudinal edge BS1, the coupling appendage A and, along its lower longitudinal edge BI1, the hollow coupling seat C of the slat. An outer face FE and an inner face FI may be defined on the main elongated body E1. The slat D1 further comprises a secondary elongated body E2 made of plastic material (having a coefficient of thermal conductivity lower than the metallic material), which is configured to couple to the main elongated body E2 at the inner face FI of said body and thus form an insulating layer. The two elongated bodies E1 and E2 are countershaped to snap together. In particular, the secondary elongated body E2 defines two engagement seats S1 and S2, respectively obtained at its upper longitudinal edge BS2 and its lower longitudinal edge BI2. The engagement seat S1 is intended to snap-fit with a tooth T1 protruding from the main elongated body E1 in proximity to the coupling appendage A. The engagement seat S2 is intended, on the other hand, to couple with one of the two walls that delimit the hollow coupling seat C in the main elongated body E1. The secondary elongated body E2 is then shaped to cover the entire inner face FI of the main elongated body E1, leaving only the coupling appendage A uncovered.

[0008] The technical solution just described allows the thermal insulation capacity of a shutter made of metal slats to be increased.

[0009] The need to reduce energy consumption, however, keeps the need to further improve the performance of this type of slat in terms of thermal insulation relevant.

Disclosure of the invention

[0010] Therefore, it is the main object of the present invention to eliminate in whole or in part the drawbacks of the above-mentioned prior art by making available a slat for rolling shutters having a superior thermal insulation capacity with respect to the known slats having an insulating coating.

[0011] 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

[0012] The technical features of the invention, according to the aforesaid objects, may be clearly seen in the content of the claims below, and its advantages will be-

come more readily apparent in the detailed description that follows, made with reference to the accompanying drawings, which illustrate one or more purely exemplifying and non-limiting embodiments thereof, wherein:

- Fig. 1 is a cross-sectional view of a traditional slat for roller shutters;
- Fig. 2a, 2b and 2c show two slats of Fig. 1 coupled to each other and shown in three different operating positions;
- Fig. 3 is a cross-sectional view of a slat for roller shutters of a known type provided with a coating made of plastic material;
- Fig. 4 is an exploded view of the slat shown in Fig. 3;
- Fig. 5 is a cross-sectional view of a slat for roller shutters according to a preferred embodiment of the present invention;
- Fig. 6 is an exploded view of the slat shown in Fig. 5;
- Fig. 7 shows the two slats of Fig. 5 coupled together;
- Fig. 8 is a cross-sectional view of a slat for roller shutters according to a preferred embodiment of the present invention;
- Fig. 9 is an exploded view of the slat shown in Fig. 8; and
- Fig. 10 shows the two slats of Fig. 8 coupled together.

Detailed description

[0013] The slat 1 for roller shutters according to the invention has been indicated as a whole by the reference number 1 in the accompanying figures.

[0014] Herein and in the following description and claims, reference will be made to the slat 1 in an assembled condition inside a shutter and arranged on a vertical plane. Therefore, any references to a lower or upper position or to a horizontal or vertical orientation should be understood in this condition.

[0015] According to a general embodiment of the invention, the slat 1 for rolling shutters is defined by the coupling of two elongated bodies 10, 20 that both extend along a longitudinal direction X of the slat 1 (axis orthogonal to the sheet in the accompanying figures).

[0016] A first elongated body 10 is made of a first material and defines a first face 2 of the slat 1 intended in use to face the outside of a compartment, engaged in closure by a shutter in which the slat 1 is incorporated.

[0017] A second elongated body 20 is made of a second material having a lower coefficient of thermal conductivity than the first material and defines a second face 3 of the slat 1 intended in use to face the inside of said compartment.

[0018] Therefore, the second elongated body 20 has a thermal insulation function.

[0019] On each elongated body 10 and 20, a coupling face 13 and 23 is defined at which an elongated body 10 or 20 couples with the other elongated body 20 or 10.

[0020] The slat 1 comprises a coupling appendage 4, formed at an upper longitudinal edge 6 of the slat, and a coupling cavity 5, formed at a lower longitudinal edge 7 of the slat.

[0021] Functionally, as shown in Fig. 7 and 10, the coupling cavity 5 is intended to be engaged by the coupling appendage of a first slat identical to said slat 1, while the coupling appendage 4 is intended to engage the coupling cavity of a second slat (not shown in the figures) identical to said slat 1. More specifically, the coupling cavity 5 is designed to define, with a coupling appendage 4, an articulated coupling, wherein the coupling appendage 4 is free to slide inside said cavity 5 in a direction Y, transverse to said longitudinal direction X, and to rotate at least partially about said longitudinal direction X.

[0022] As shown in the appended figures, the coupling appendage 4 is defined entirely by the first elongated body 10.

[0023] According to the invention, the coupling cavity 5 is delimited in part by the first elongated body 10 and in part by the second elongated body 20.

[0024] By virtue of the invention, the second elongated body 20, by helping to define the aforesaid coupling cavity 5, becomes a structural part of the slat 1. It follows that at least at the coupling cavity 5, the second elongated body 20 is not in close contact with the first elongated body 10. This reduces the thermal contact surface between the first elongated body 10 and the second elongated body 20. This helps to reduce the thermal bridging effect between the two bodies, thus improving the thermal insulation capacity conferred by the second elongated body 20 to the slat 1.

[0025] In fact, in the solutions of the prior art, the profile in insulating material coupled to the main body of the slat is shaped in such a way as to cover the entire inner face of the main body, leaving only the coupling appendage uncovered. Therefore, the profile of insulating material covers the main body also at the portion that defines the coupling cavity, thus creating a close thermal connection also in that portion of the slat.

[0026] According to the invention, however, the first elongated body 10 only partially defines the coupling cavity 5. This cavity is, in fact, structurally completed by the second elongated body 20 made of material with a lower thermal conductivity coefficient than the material of which the first elongated body is made. As already mentioned, this configuration reduces the thermal contact surface between the two bodies, improving the thermal insulation capacity conferred by the second elongated body 20 to the slat 1.

[0027] Preferably, as illustrated in the appended figures, said coupling cavity 5 is defined by:

- a first side wall 51;
- a second side wall 52 opposite the first side wall; and
- a bottom wall 53 which connects the two side walls 51, 52 and is opposite an entrance opening 55 to said cavity 5.

[0028] The second side wall 52 is arranged on the inner

face 3 of the slat 1 and has a free end 54 shaped like a hook that partially closes the entrance opening 55 to said cavity.

[0029] Said second side wall 52 is defined by a first portion 45 of the second elongated body 20.

[0030] According to a first preferred embodiment illustrated in Fig. 5, 6 and 7, the aforesaid bottom wall 53 is also defined by said second elongated body 20, in particular by a second portion 44 thereof, while only the aforesaid first side wall 51 is defined by said first elongated body 10, in particular by a first portion 34 thereof.

[0031] According to a second preferred embodiment shown in Fig. 8, 9 and 10, both the first side wall 51 and the bottom wall 53 are defined by portions 34, 63 of the first elongated body 10, while only the second side wall 52 is defined by the second elongated body 20, in particular by a first portion 45 thereof.

[0032] Preferably, the first elongated body 10 and the second elongated body 10 are coupled to each other via snap-fitting means formed on the respective coupling faces 13, 23 of said two elongated bodies 10, 20.

[0033] Advantageously, said snap-fitting means are configured to define two distinct connection zones between the two elongated bodies 10 and 20. A first connection zone is defined in proximity to the coupling appendage 4, while a second connection zone is defined in proximity to the coupling cavity 5.

[0034] Preferably, the first elongated body 10 and the second elongated body 20 are mutually shaped at the respective coupling surfaces 13 and 23 in such a way that they only contact each other at the portions defining said snap-fitting means. This further reduces the thermal contact surface between the two bodies 10 and 20, thereby reducing the heat transfer between the two bodies and thus increasing the thermal insulation capacity conferred on slat 1 by the second elongated body 20.

[0035] In particular, as shown in the accompanying Fig. 5 and 7, the first elongated body 10 and the second elongated body 20 are reciprocally shaped at the respective coupling surfaces 13 and 23 in such a way that once coupled by means of the aforesaid snap-fitting means, an inner gap 47, 74 is formed between the two bodies, which distances the two bodies from each other in the intermediate portion of the slat 1 comprised between the two connection zones defined by the snap-fitting means.

[0036] According to the first preferred embodiment illustrated in Fig. 5, 6 and 7, the first elongated body 10 defines:

- a tooth formation 31 that is formed in proximity to the coupling appendage 4 along the upper longitudinal edge 6 of the slat 1 and delimits, with the coupling appendage 4, a first groove 32; said first groove 32 is open toward the coupling appendage 4 (i.e., open upwardly); and
- a second groove 33 that is formed in proximity to the first side wall 51 of the coupling cavity 5 and is open toward the coupling cavity 5 (i.e., open downwardly).

[0037] In turn, the second elongated body 20 defines an engagement seat 41 that is formed along the upper longitudinal edge 4 of the slat 1 and is shaped to accommodate the aforesaid tooth formation 31.

[0038] A flexible appendage 42 extends in proximity to the engagement seat 41 suitable to snap into the first groove 32, allowing the tooth formation 31 to insert itself into the engagement seat 41.

[0039] The second elongated body 20 further defines a wing 44 extending cantilevered from the coupling surface 23 of said second elongated body 20 and defines the bottom wall 53 of said coupling cavity 5. The aforesaid wing 44 has a shaped free end 43 suitable for engaging the second groove 33.

[0040] Functionally, in the first embodiment shown in Fig. 5, 6, and 7, the snap-fitting means are defined:

- in the first elongated body 10 by: tooth formation 31; first groove 32; and second groove 33;
- in the second elongated body 20 by: engagement seat 41; flexible appendage 42; wing 44 with its shaped free end 43.

[0041] Functionally, in the assembled condition the slat 1 supports the weight of a slat coupled at the bottom thereof at the portion 45 of the second elongated body 20. However, mechanical stresses are transmitted to the upper slat by the first elongated body 10, primarily at the tooth formation 31.

[0042] Advantageously, as shown in Fig. 6, the first elongated body 10 comprises a connecting wall 35 that connects the tooth formation 31 with the second groove 33. In particular, said connecting wall 35 defines a concave surface. The second elongated body 20 comprises a connecting wall 46 that connects the engagement seat 41 to the wing 44. In particular, said connecting wall 46 defines a concave surface. The two connecting walls 35 and 46 of two elongated bodies are mutually shaped to allow for mutual interpenetration without, however, providing for a direct contact, so as to create - in the assembled condition - a gap 47 between the two elongated bodies 10 and 20.

[0043] Advantageously, as shown in Fig. 6, the first elongated body 10 comprises a portion 34, which extends from the second groove 33 toward the lower longitudinal edge 7 of the slat 1 and defines the first side wall 51 of the coupling cavity 5. The second elongated body 20 comprises a hook-shaped portion 45, which extends from the wing 44 toward the lower longitudinal edge 7 of the slat 1 and defines the second side wall 52 of the coupling cavity 5, as well as the hook-shaped free end 54, which partially closes the entrance opening 55 of said cavity.

[0044] According to the second preferred embodiment shown in Fig. 8, 9 and 10, the first elongated body 10 defines:

- a first shaped appendage 61, which extends cantilevered from the coupling surface 13 of the first elon-

gated body 10 in proximity to the coupling appendage 4 along the upper longitudinal edge 6 of the slat 1 and delimits a first seat 62, which is open in the opposite direction of the coupling appendage 4 (i.e., open downwardly); and

- a second shaped appendage 63, which extends cantilevered from the coupling surface 13 of said first elongated body 10 in proximity to the coupling cavity 5 and delimits a second seat 64, which is open in the opposite direction of the coupling cavity 5 (i.e., open upwardly).

[0045] Said second shaped appendage 63 defines the bottom wall 53 of said coupling cavity 5.

[0046] In turn, the second elongated body 20 defines:

- a flexible appendage 71, which extends cantilevered from the coupling surface 23 of said second elongated body 20 along the upper longitudinal edge 6 of the slat 1 and is suitable to snap-fit against the aforesaid first shaped appendage 61 by inserting itself into said first seat 62; and
- a tooth-like formation 72, which extends from the coupling surface 23 of said second elongated body 20 in proximity to the second side wall 52 of said coupling cavity 5 and is suitable to engage said second seat 64.

[0047] Functionally, in the second embodiment shown in Fig. 8, 9, and 10, the snap-fitting means are defined:

- in the first elongated body 10 by: first shaped appendage 61 and its first seat 62; second shaped appendage 63 and its second seat 64;
- in the second elongated body 20 by: flexible appendage 71; tooth formation 72.

[0048] Functionally, in the assembled condition, the slat 1 supports the weight of a slat coupled at the bottom thereof at the portion 45 of the second elongated body 20. However, mechanical stresses are transmitted to the upper slat by the first elongated body 10, primarily at the second shaped appendage 63.

[0049] Advantageously, as shown in Fig. 9, the first elongated body 10 comprises a connecting wall 65 connecting the first shaped appendage 61 with the second shaped appendage 63. In particular, said connecting wall 65 defines a flat surface. Said connecting wall 65 may also define a concave surface. The second elongated body 20 comprises a connecting wall 73 that connects the flexible appendage 71 to the tooth formation 72. In particular, said connecting wall 73 defines a concave surface. The two connecting walls 65 and 73 of the two elongated bodies are mutually shaped to allow for mutual interpenetration without, however, providing for direct contact, so as to create - in the assembled condition - a gap 74.

[0050] Advantageously, as shown in Fig. 9, the first elongated body 10 comprises a portion 34, which extends from the second shaped appendage 63 toward the lower longitudinal edge 7 of the slat 1 and defines the first side wall 51 of the coupling cavity 5. The second elongated body 20 comprises a hook-shaped portion 45, which extends from the tooth formation 72 toward the lower longitudinal edge 7 of the slat 1 and defines the second side wall 52 of the coupling cavity 5, as well as the hook-shaped free end 54, which partially closes the entrance opening 55 of said cavity.

[0051] Advantageously, the first material from which the first elongated body 10 is made is metallic material, preferably steel or aluminum, particularly painted.

[0052] Preferably, said first elongated body 10 is made by bending and profiling a metal sheet.

[0053] Advantageously, the first elongated body 10 is internally hollow and is filled with polymeric material, preferably polyurethane foam.

[0054] Advantageously, the second material from which the second elongated body 20 is made is plastic material, preferably PVC.

[0055] Preferably, the second elongated body 20 is made by extrusion.

[0056] 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.

[0057] The invention allows numerous advantages to be obtained, which have already been described in part.

[0058] The slat 1 for rolling shutters according to the invention has a higher thermal insulation capacity with respect to known slats with insulating coating, due to the smaller contact surface between the first elongated body and the second elongated body made of material with a lower thermal conductivity coefficient than the first one.

[0059] The slat 1 for roller shutters according to the invention is furthermore simple and cost-effective to produce.

[0060] The invention thus conceived therefore achieves its intended objects.

[0061] Obviously, in its practical embodiment it may also assume forms and configurations different from the one illustrated above, without thereby departing from the present scope of protection.

[0062] Furthermore, all details may be replaced with technically equivalent elements, and the dimensions, shapes, and materials used may be any according to the needs.

Claims

1. A slat (1) for roller shutters, defined by the coupling of two elongated bodies (10, 20) both extending along a longitudinal direction (X) of the slat (1), wherein a first elongated body (10) is made of a first material and defines a first face (2) of the slat (1) intended in use to be facing towards the outside of

a compartment, and wherein a second elongated body (20) is made of a second material having a coefficient of thermal conductivity lower than that of the first material and defines a second face (3) of the slat (1) intended in use to be facing towards the inside of said compartment, said slat (1) comprising a coupling appendage (4), made at an upper longitudinal edge (6) of the slat, and a coupling cavity (5), made at a lower longitudinal edge (7) of the slat, said coupling appendage (4) being entirely defined by said first elongated body (10), **characterised in that** said coupling cavity (5) is delimited in part by said first elongated body (10) and in part by said second elongated body (20).

2. The slat (1) according to claim 1, wherein said coupling cavity (5) is defined by:

- a first side wall (51);
- a second side wall (52) opposite the first side wall; and
- a bottom wall (53) connecting the two side walls (51, 52) and opposite an entrance opening (55) to said cavity (5),

said second side wall (52) having a hook-shaped free end (54) that partially closes the entrance opening (55) to said cavity, and wherein said second side wall (52) is arranged on the inner face (3) of the slat (1) and is defined by a first portion (45) of said second elongated body (20).

3. The slat (1) according to claim 2, wherein said bottom wall (53) is defined by a second portion (44) of said second elongated body (20), while only said first side wall (51) is defined by a first portion (34) of said first elongated body (10).

4. The slat (1) according to claim 2, wherein said first side wall (51) and said bottom wall (53) are both defined by portions (34; 63) of said first elongated body (10), while only said second side wall (52) is defined by a first portion (45) of said second elongated body (20).

5. The slat (1) according to any of the preceding claims, wherein said first elongated body (10) and said second elongated body (10) are coupled to each other by means of snap-fit coupling means made on respective coupling faces (13, 23) of said two elongated bodies (10, 20) .

6. The slat (1) according to claim 5, wherein said snap-fit coupling means are configured to define two distinct connection zones between the two elongated bodies (10; 20), and wherein preferably a first connection zone is defined in proximity to the coupling appendage (4), and a second connection zone is defined in proximity to the coupling cavity (5).

7. The slat (1) according to claim 6, wherein the first elongated body (10) and the second elongated body (20) are mutually shaped at respective coupling surfaces (13; 23) so as to come into contact only at portions defining the aforesaid snap-fit coupling means.

8. The slat (1) according to claim 3 and one of the claims 5, 6 and 7, wherein said first elongated body (10) defines:

- a tooth formation (31) which is made in proximity to the coupling appendage (4) along the upper longitudinal edge (6) and delimits with said coupling appendage (4) a first groove (32); and
- a second groove (33) which is made in proximity to the first side wall (51) of said coupling cavity (5) and is open towards the coupling cavity (5),

and wherein said second elongated body (20) defines:

- an engagement seat (41) which is made along the upper longitudinal edge (6) and is shaped to house said tooth formation (31), wherein a flexible appendage (42) extends in proximity to said engagement seat (41) to snap fit into said first groove (32) allowing said tooth formation (31) to insert itself into said engagement seat (41); and
- a wing (44) which extends cantilevered from the coupling surface (23) of said second elongated body (20) and defines the bottom wall (53) of said coupling cavity (5), said wing (44) having a shaped free end (43) suitable to engage said second groove (33).

9. The slat (1) according to claim 4 and one of the claims 5, 6 and 7, wherein said first elongated body (10) defines:

- a first shaped appendage (61) extending cantilevered from the coupling surface (13) of said first elongated body (10) in proximity to the engagement appendage (4) along the upper longitudinal edge (6) and delimiting a first seat (62) open in a direction opposite to the engagement appendage (4); and
- a second shaped appendage (63) extending cantilevered from the coupling surface (13) of said first elongated body (10) in proximity to the coupling cavity (5) and delimiting a second seat (64) open in the opposite direction to the coupling cavity (5), said second shaped appendage

(63) defining the bottom wall (53) of said coupling cavity (5),

and wherein said second elongated body (20) defines:

- a flexible appendage (71) extending cantilevered from the coupling surface (23) of said second elongated body (20) along the upper longitudinal edge (6) and suitable to snap-fit against said first shaped appendage (61) by inserting itself in said first seat (62); and
- a tooth formation (72) extending from the coupling surface (23) of said second elongated body (20) in proximity to the second side wall (52) of said coupling cavity (5) and suitable to engage said second seat (33).

10. The slat (1) according to any of the preceding claims, wherein said first material is metallic material, preferably steel or aluminum, in particular painted.

11. The slat (1) according to claim 10, wherein said first elongated body (10) is made by bending and profiling a metal sheet.

12. The slat (1) according to any of the preceding claims, wherein said first elongated body (10) is internally hollow and is filled with polymeric material, preferably polyurethane foam.

13. The slat (1) according to any of the preceding claims, wherein said second material is plastic material, preferably PVC.

14. The slat (1) according to claim 13, wherein said second elongated body (20) is made by extrusion.

15. Roller shutter, comprising a plurality of slats engaged with each other in pairs, **characterized in that** each of said slats is a slat (1) according to any of the preceding claims.

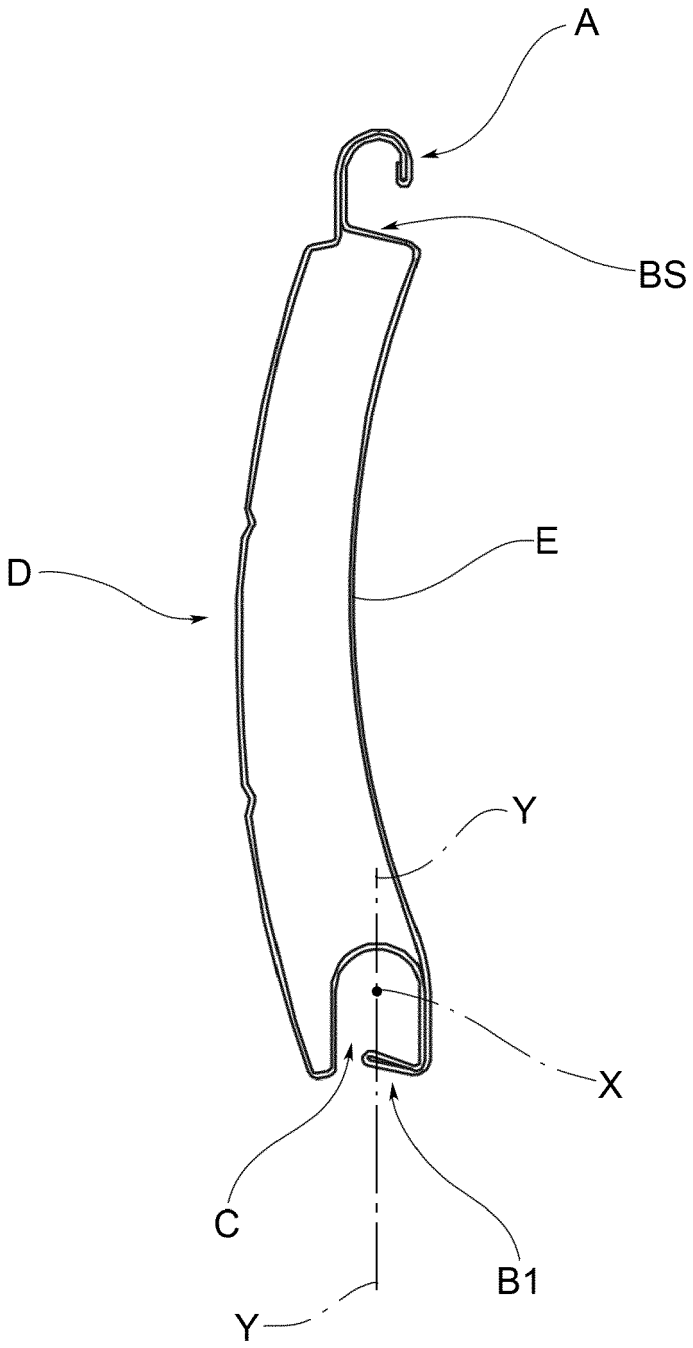


FIG.1

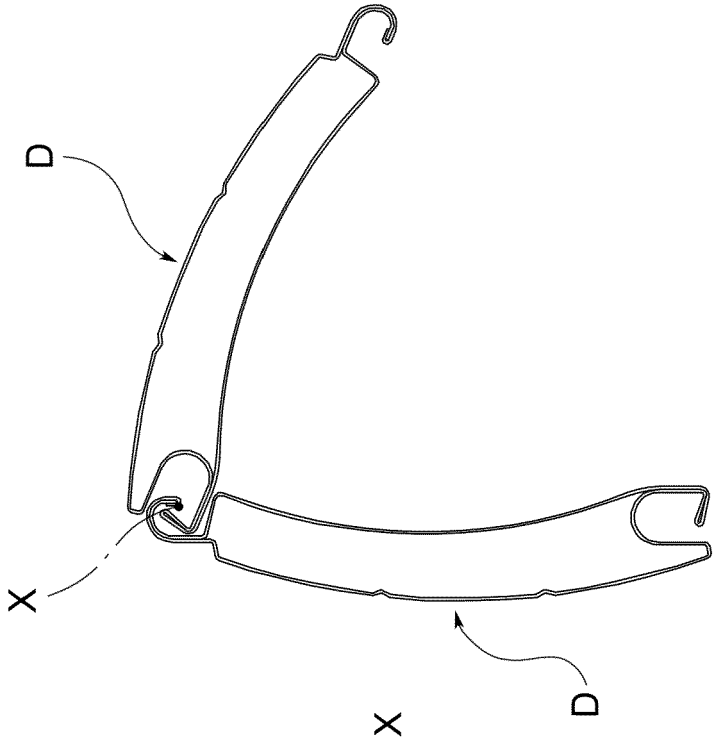


FIG.2c

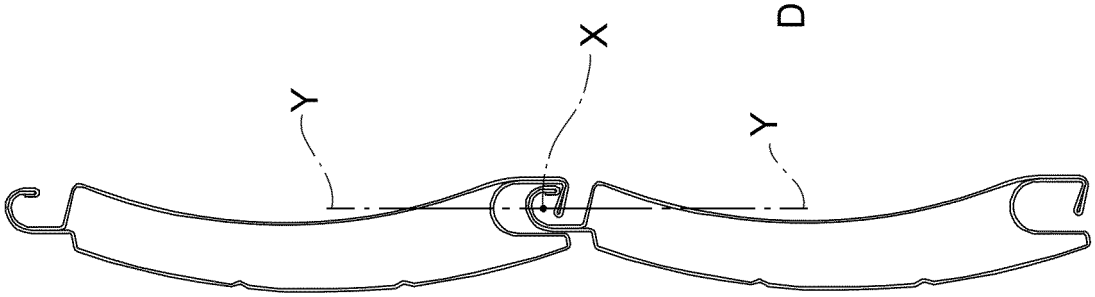


FIG.2b

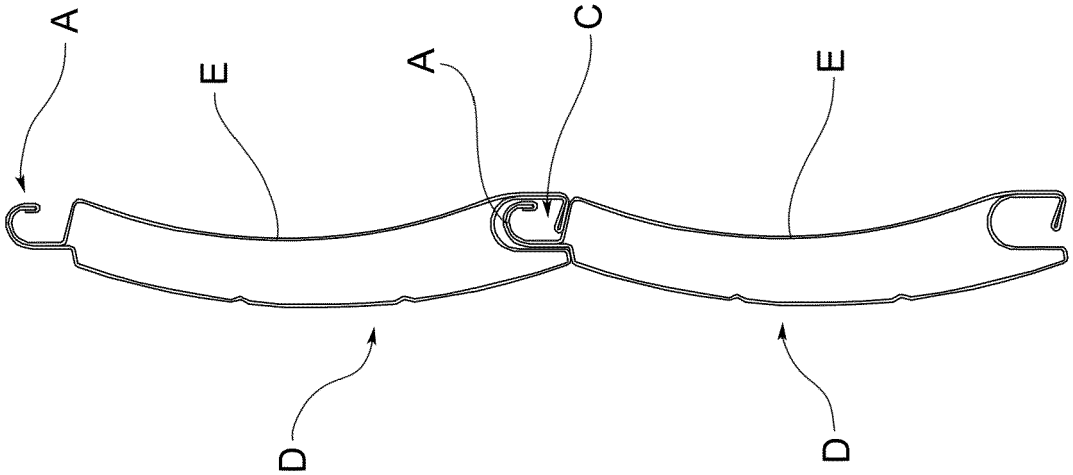


FIG.2a

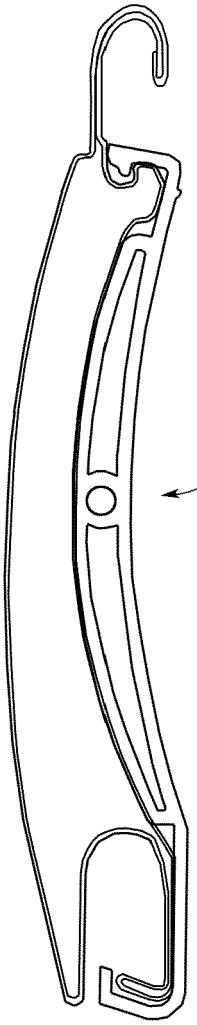


FIG.3

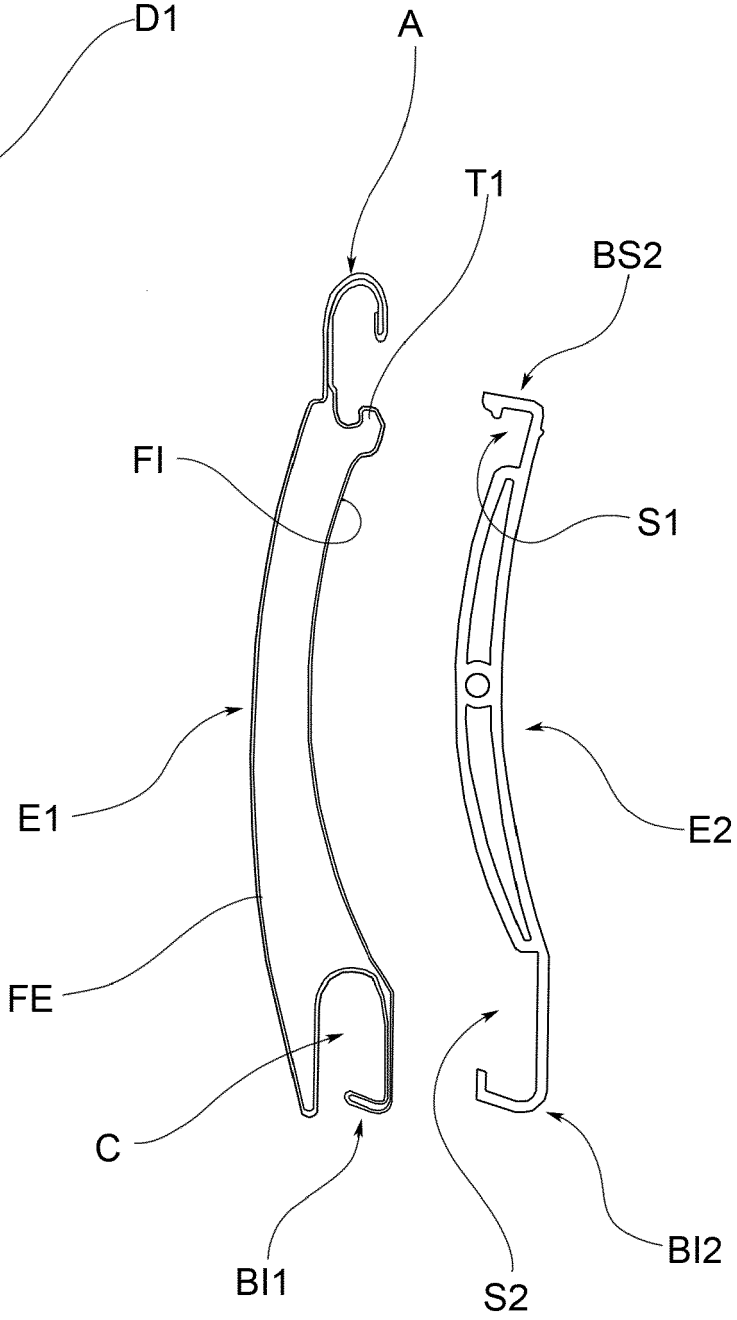
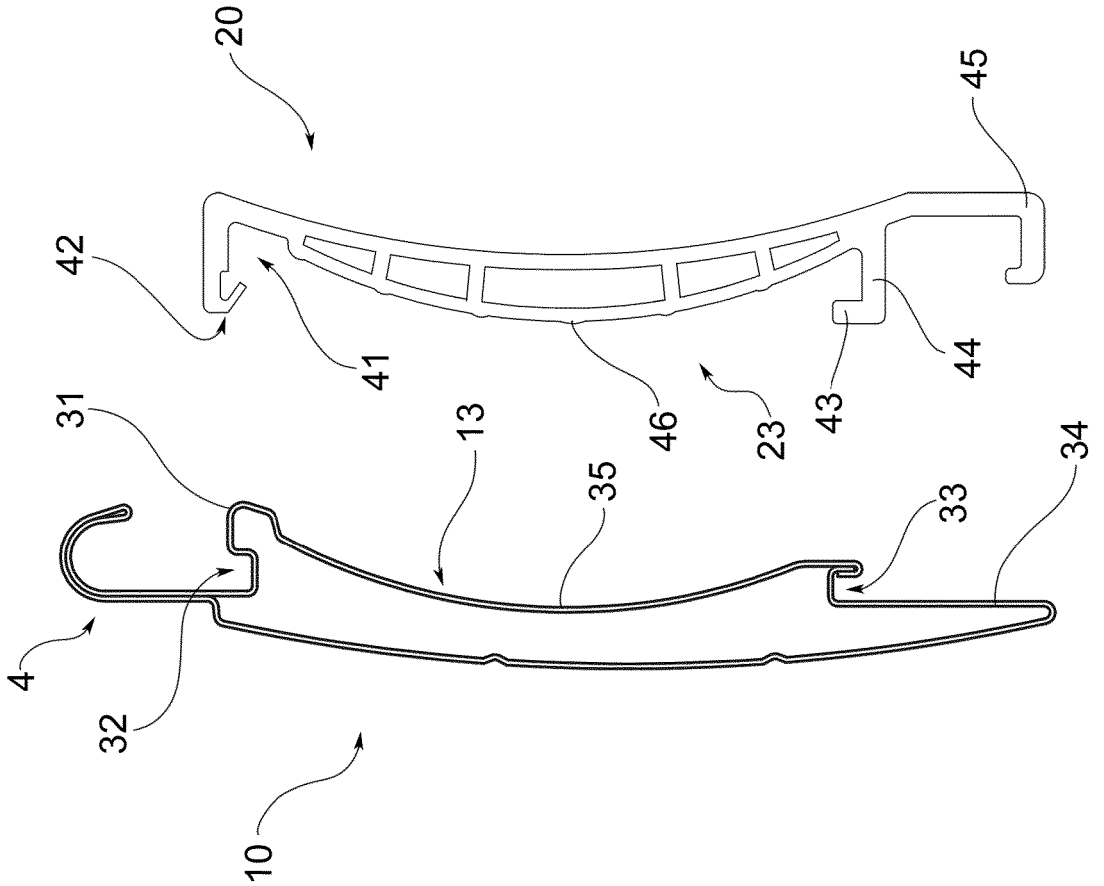


FIG.4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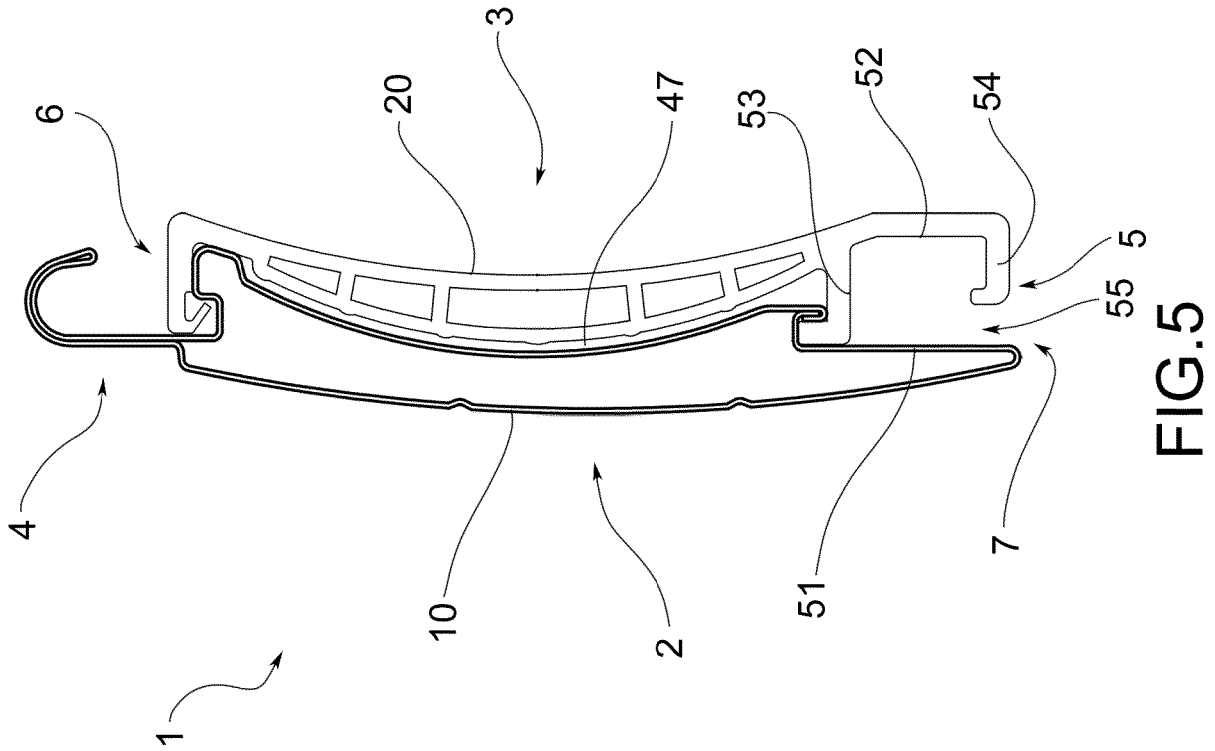
32
10

FIG.6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7
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FIG.5

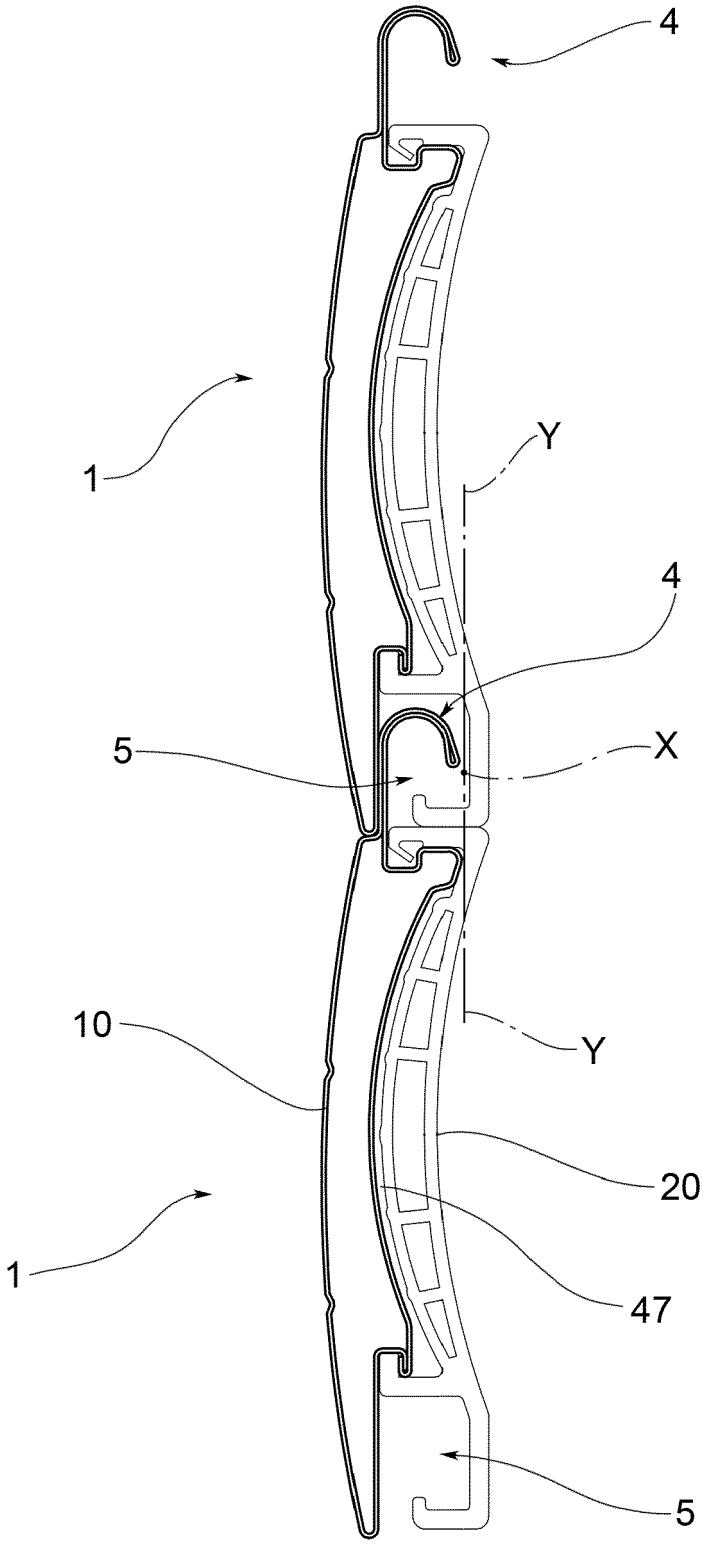

FIG.7

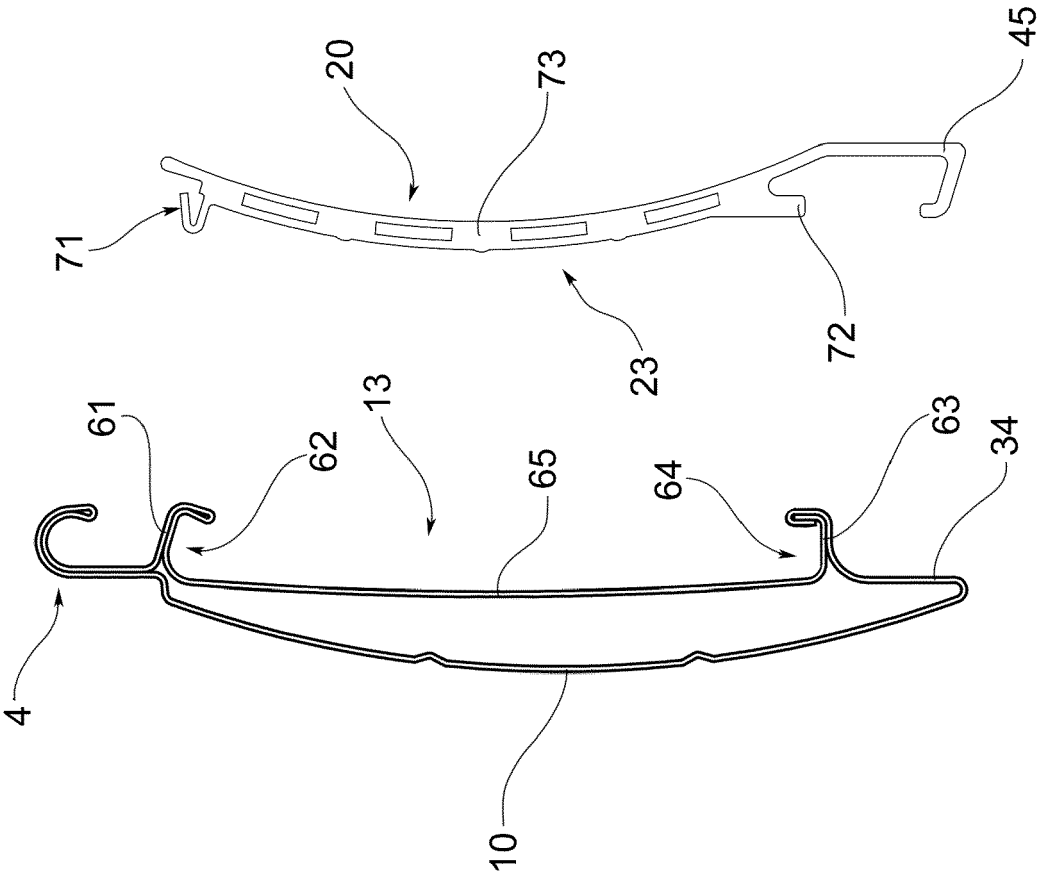
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FIG.9

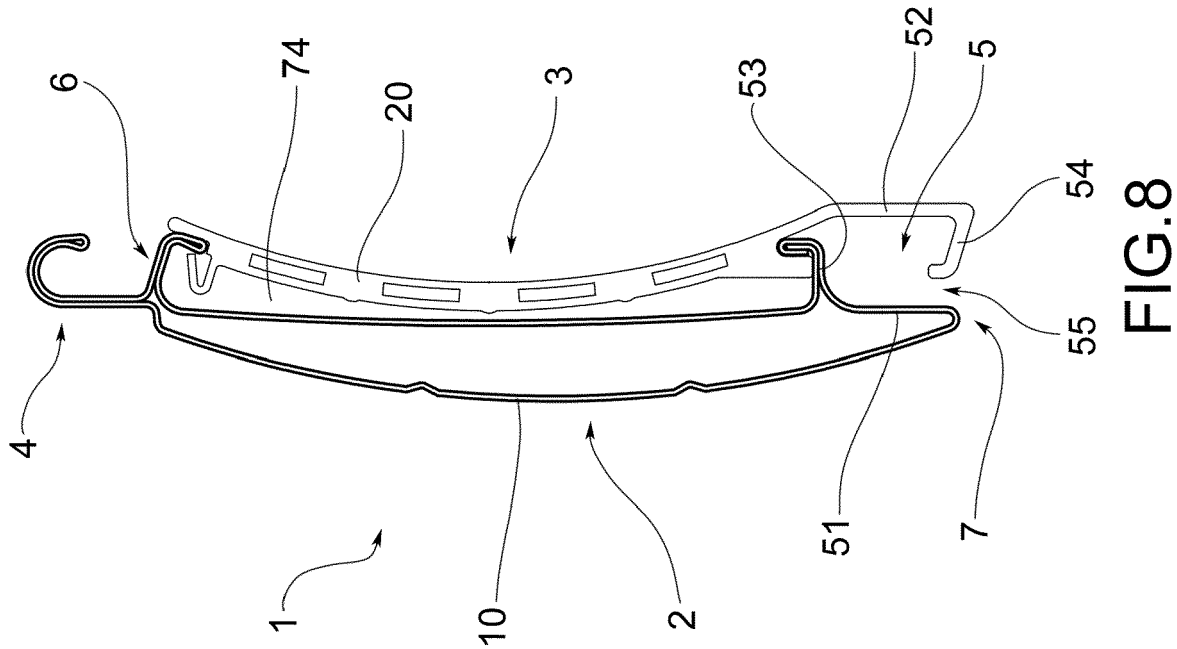
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FIG.8

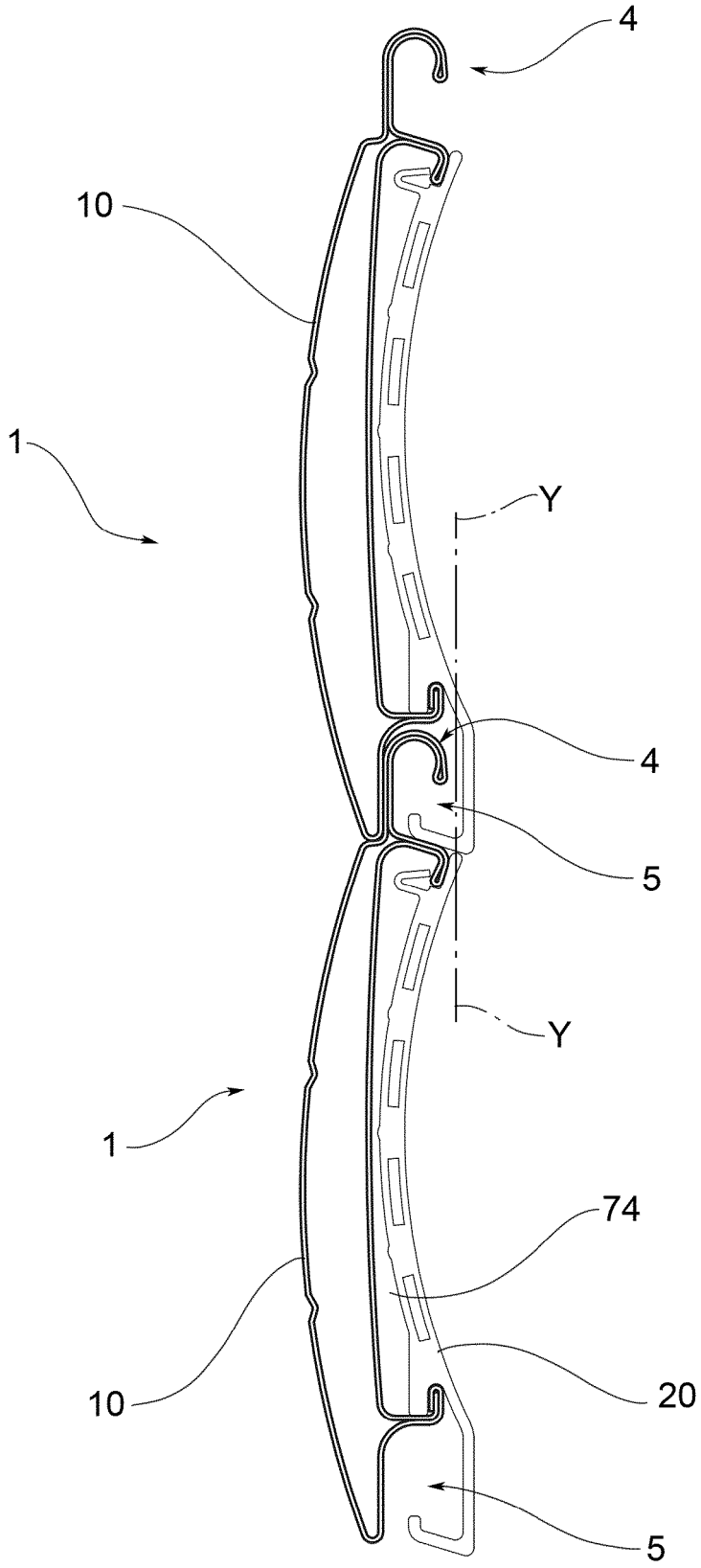

FIG.10

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EUROPEAN SEARCH REPORT

Application Number
EP 22 16 5141

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X Y A	FR 2 352 148 A1 (GRASHEI F ALUKON KG [DE]) 16 December 1977 (1977-12-16) * abstract; figures 1-3 * * page 3, lines 31-40 * * page 4, paragraph 1 * -----	1-7, 10-15 9 8	INV. E06B9/11 E06B9/15
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 September 2022	Wehland, Florian

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