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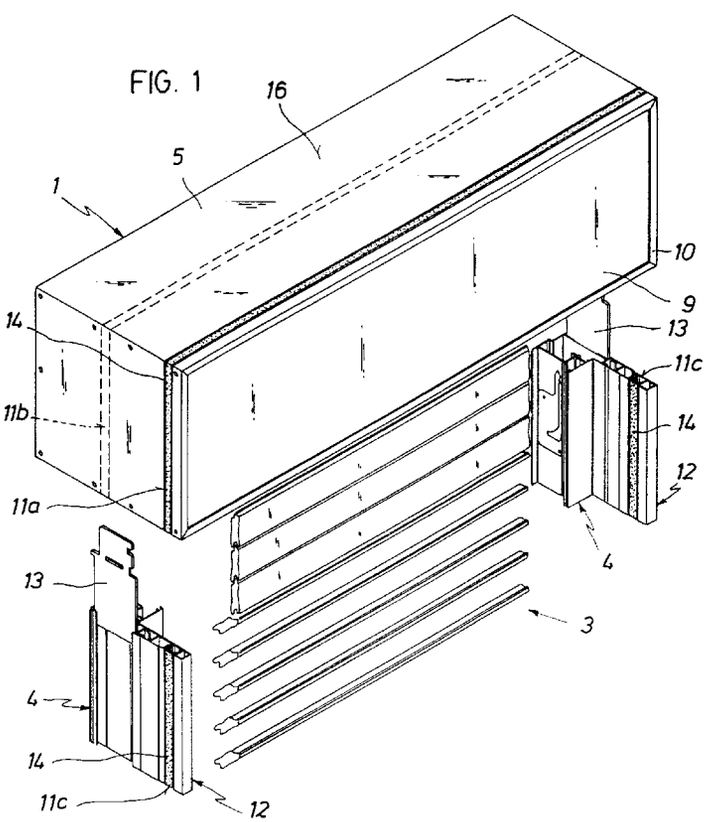
(54) Self-supporting structure for a roller blind

(57) The structure comprises a supporting box (1), formed by upper and lower walls (5, 6), two end caps (7), a side wall (8) and a cover (9) each of which is formed by: an association of metallic sections (20), which define two longitudinal edges and an outer surface (16), the outer surfaces of the sections of one same association being coplanar; and by an insulating section (14) which is comprised between two metallic sections (20) of one same association and attached to the longitudinal edges of the metallic sections (20) between which it is situated; each of said insulating sections (14) extends between the insulating sections (14) of the adjacent walls (5, 6) or end caps (7).

FIG. 1



EP 0 915 227 A2

Description

[0001] This invention relates to a self-supporting structure for a roller blind, the structure being of the type comprising [i] a supporting box having an upper wall, a lower wall, two end caps, a side wall and a cover; [ii] an axle for rolling up the blind, contained in said box; and [iii] guide rails for the blind.

[0002] In the structure, the box for supporting and containing the blind roll-up axle, the guide rails therefor and the operator members are firmly associated together to form a unit adapted for direct installation, without masonry work, in the corresponding aperture in a building.

[0003] A blind of this nature is the one disclosed in Spanish patent 95 014 54 of the same applicant, in which there is described an orientable slat roller blind of the type described in Spanish patents 240 335 and 251 601, which comprises two end caps which, associated together by means of two or more sheet-like sections, form a rigid box, which may be openable, for containing the blind roll-up axle, the rolled-up blind unit and the operator mechanisms therefor. These end caps have means for the firm attachment thereof to the respective guide rails for the blind, in coplanar arrangement therewith, such that there is formed a self-supporting unit of rectangular elevation, which is dimensionally stable and appropriate for being directly anchored in the aperture or opening of a building, without the need for performing masonry work.

[0004] While the invention of said patent ES 95 014 54 relates to blinds having orientable slats, it is also applicable to conventional roller blinds, in which the slats may only move apart from each other but cannot tilt or be orientated, it being sufficient for this purpose only to simply adapt the guide rails of the blind.

[0005] The boxes for supporting and containing the roll-up axles for roller blinds of all types, to which reference has been made up to here, are formed by two metallic end caps connected together by two or more sheetlike, also metallic, sections since they have to form a strong arrangement supported, preferably, only by the guide rails, fixedly attached to the building, which must withstand the weight of the blind and the stresses transmitted to the roll-up axle when the blind is being operated.

[0006] Since there are blinds of different lengths, boxes having a different roll-up capacity are also required, although in general, all cases are satisfied with only two types, namely, one for windows and the other for balconies. Nevertheless, the problem becomes complicated, because the arrangement of the box is different for the same length of blind, depending on whether the blind is rolled up towards the inside or the outside of the building.

[0007] Thus, it turns out that a good number of types of the sections forming the body of the box when both end caps are associated together must be available.

[0008] Also, the fact that the whole box is formed with metal sections means that the outdoor temperature is transmitted through the box, to the inside of the building and vice versa, which leads to high energy losses, either in heating or in cooling. This situation is aggravated when the carpentry is metallic and has no interruption of the thermal bridges.

[0009] Thus, it would be desirable to have a blind which combined the need to use a small number of metal sections for forming the different variations of blind boxes with the need for the box to have a thermal bridge interrupting arrangement in co-operation with the blind guide rails.

[0010] This object is achieved with a structure of the type first mentioned above, which is characterised in that each of the said walls and each of said end caps is formed by: [a] an association of metallic sections, each of which defines two longitudinal edges and an outer surface, such that the outer surfaces of the sections of one same association are substantially coplanar; and [b] by an insulating section comprised between two metallic sections of one same association and attached to the longitudinal edges of the metallic sections between which it is situated; each of said insulating sections extending between the insulating sections of the adjacent walls or end caps.

[0011] The self-supporting structure according to the invention has been developed therewith, in which the body and the end caps of the roll-up axle supporting box are formed by the longitudinal association of metallic sections which, when joined together longitudinally, form said body and end caps of the box, except for a cover. Certain of these sections, when longitudinally attached together at the edges thereof, include between two of them a thermal bridge interrupting insulation section, which is arranged in such a way as to extend along respective longitudinal lines of the box body and a like number of lines of the end caps, such lines describing, as a whole, a longitudinal perimeter of the box.

[0012] These metal sections are provided at both longitudinal edges thereof with arrangements allowing them to be attached to another section, with the insulating section or with the cover, such arrangements being for one or the other, as described hereinafter:

1. a dovetail groove which opens transversally towards the outside of the section and which mates with the longitudinal edges of the insulating section.
2. a groove opening transversally towards the outside of the section and which forms an L-shaped gripping arrangement.
3. a projection provided with a low barb, which mates with the L-shaped gripping arrangement of another metallic section.

4. a groove opening transversally towards the outside of the section and which mates with a weather strip mounted in the opening through which the blind passes when entering or leaving the roll-up box therefor.
5. a U-shaped groove extended on the inner side thereof in an outstanding, inwardly directed step, having a tread parallel to the surface of the section and a riser perpendicular to the surface of said metallic section.
6. a dovetail groove which opens transversally towards the outside of the section and which mates with the edges of the insulating section, while at the other longitudinal edge it is provided with a U-shaped groove having as an extension of the inner surface an outstanding step.

[0013] Furthermore, said metallic sections are provided, at the surface facing inwardly of the box, with one or another of the different ribs which, for guiding and fixing the members, are listed below:

a. L-shaped tab form ribs provided with gripping means.
b. cord-like ribs having a cylindrical groove.
c. one or another of the corded ribs are provided with outwardly extending straight tabs which, oppositely disposed in pairs, are parallel to the plane of the metallic section.
d. guide ribs having the form of pairs of L-shaped tabs with the concave portions facing each other.

[0014] The invention contemplates that the box be firmly associated with the sections of the blind guide rails by strong members coupled both to the box end caps and to the blind guide rail sections.

[0015] Further details of the invention will be disclosed in the following description, with reference to the enclosed drawings, in which:

[0016] Figure 1 is a partly exploded perspective view of the structure of the invention and of the blind slats, shown without the operating chains.

[0017] Figure 2 is a side elevation view of a box for containing an outwardly rolled up blind.

[0018] Figure 3 is a side elevation view of a box for containing an inwardly rolled up blind.

[0019] Figures 4 to 9 are elevation views of the metallic sections of the structure of the invention.

[0020] Figure 10 is a right cross section of a guide rail and of a support section mounted in the aperture of a building.

[0021] Figure 11 is an exploded perspective view of an end portion of a box, with the cover removed, and of a blind guide rail, of the blind and of the blind roll-up axle.

[0022] Figure 12 is a side elevation view, partly in section, of an outwardly rolled up blind, installed in the aperture of a building.

[0023] Figure 13 is a side elevation view, partly in section, of an inwardly rolled up blind, installed in the aperture of a building.

[0024] The present self-supporting structure for roller blinds, as may be seen in Figures 1 and 11 to 13, essentially comprises, for the purposes of the invention, a box 1 for supporting and containing the roll-up axle 2 of a blind 3 and guide rails 4 in which the blind may slide.

[0025] The box 1 is parallelepipedic in shape and is formed by an upper wall 5, a lower wall 6 (Figures 2, 3 and 11 to 13), two end caps 7, a side wall 8 (Figures 2, 3 and 11 to 13) and a cover 9 accompanied by a resilient sealing section 10. The upper and lower walls 5 and 6 and the two end caps 7 comprise an insulating section 14, to be referred to hereinafter. The insulating section 14 is disposed on a continuous line 11 interrupting the thermal bridge, which takes on the position of line 11a, when the blind is disposed for outwardly rolling up, as may be seen in Figures 1, 2 and 12, and the position of the line 11b, when the blind is arranged for inwardly rolling up, as may be seen in Figures 1 (in phantom line), 3, 11 and 13.

[0026] The guide rails 4 for the blind 3 are accompanied by support sections 12 therefor, with which the rails 4 engage. The support sections 12 are also provided with an insulating section which extends along a longitudinal line 11c interrupting the thermal bridge.

[0027] The box 1 and the guide rails 4 are fitted together with strong members formed, in this case, by plates 13 which are plugged into guide formations provided in the end caps 7 and in the guide rails 4, as described hereinafter.

[0028] The upper and lower walls 5 and 6 and the side wall 8 of the box 1 body and the end caps 7 thereof are formed by metallic sections 20 which are assembled together longitudinally. Included between certain pairs of the metallic sections 20 is an insulating section 14 interrupting the thermal bridge and which extends along the lines 11a or 11b comprised by said walls and end caps describing, as a whole in each case, a longitudinal perimeter of the box 1. In other words, each of said insulating sections 14 extends between the insulating sections 14 of the adjacent walls 5, 6 or end caps 7.

[0029] The said metallic sections 20 forming the walls 5 and 6 and the end caps 7 of the box 1 are produced preferably by extrusion of aluminium, are flattened and have reference lines in the form of grooves 15 (Figures 4 to 8) to facilitate, and define where, a longitudinal cut should be made allowing one or more sections to be obtained having different application features from those of the starting section. In this way, it becomes possible to compose the walls 5 and 6

and end caps 7 with two or more sections 20, include the insulating section 14.

[0030] The said metallic sections 20 are, in general, flattened and have substantially an smooth outer surface 16 which is situated on the outside of the box 1, and a ribbed inner surface 17, which is situated on the inside of the box 1.

[0031] Figure 4 shows a metallic section 20A, for being used in the formation of the upper wall 5 and the end caps 7. This metallic section 20A may adopt the forms of section 20Aa of maximum width, of section 20Ab of medium width and of section 20Ac of minimum width. The two last named are produced by cutting the maximum width section 20Aa along the grooves 15.

[0032] The metallic sections 20A are provided, at one of the longitudinal edges thereof, with a dovetail groove 21 which opens away from the section. It is provided at the other edge thereof with a gripping groove 22 formed by the edge itself of the metallic section 20A and a rib 21 in the form of an L-shaped tab. The free end of the tab is provided with an internal protuberance.

[0033] The metallic sections 20A are furthermore provided, between both longitudinal edges thereof, with ribs 23 in the form of L-shaped tabs provided with the internal protuberance and projections 24 defining cylindrically formed grooves 24. The projections 24 may be provided with opposed tabs 25 parallel to the plane of the metallic section 20A.

[0034] The groove 21 may have a form other than that of the dovetail shown, provided always that it mates with the right cross section of the edge of the insulating section 14.

[0035] Figure 5 shows the metallic section 20B, for use in the formation of the lower wall 6 of the box 1. It is provided at one longitudinal edge thereof with a groove 26 mating with a weather strip (not shown) of the aperture 18 (Figures 3, 12 and 13) through which the blind 3 passes on entering or leaving the box 1, situated in the lower wall 6 of the supporting box 1. The other edge of the metallic section 20B is provided with a gripping groove 22 like the one already described.

[0036] The sections 20B are furthermore provided with a groove 15 for facilitating, and defining where, a longitudinal cut should be made and, between both edges, with an L-shaped rib 23, with a projection 24 defining a cylindrically formed groove, having a guide tab 25 facing an L-shaped guide rib 27.

[0037] The metallic sections 20B may adopt the form 20Ba of maximum width and, on being cut, the form 20Bb of minimum width.

[0038] Figure 6 shows the metallic section 20C, for use in the formation of the upper and lower walls 5 and 6 and of the end caps 7 of the box 1. This section may adopt the form of section 20Ca of maximum width and, on being cut, the form of section 20Cb of minimum width.

[0039] The section 20Ca is provided along one of the longitudinal edges thereof with a dovetail groove 21 and at the other edge with a U-shaped groove 28 which is extended, along the inner surface thereof and in an inward direction by a outstanding step 29, while at the same time it is provided between both edges with a groove 15, two mutually facing guide ribs 27, a projection 24 defining a cylindrically formed groove and a U-shaped groove 28, like the previous one and adjacent thereto.

[0040] Figure 7 shows the metallic section 20D, for use in the formation of the lower wall 6 of the box 1. This section may adopt the form of section 20Da of maximum width and, on being divided, the form of section 20Db of minimum width.

[0041] The section 20Da is provided, at one of the longitudinal edges thereof, with a dovetail groove 21 and at the other edge with a groove 26, at the same time as it has a groove 15 and an L-shaped rib 23, provided with a protuberance. The section 20Db does not have the dovetail groove 21.

[0042] Figure 8 shows the metal section 20E, for use in forming the side wall 8 of the box 1 and which may adopt the form of section 20Ea, of maximum width and, on being divided, the form of section 20Eb of minimum width.

[0043] This section 20Ea is provided, at both longitudinal edges, with a projection 30 having a low barb, which mates with the gripping groove 22 of another metallic section 20A, 20B and 20Db, at the same time as it is provided, between said edges, with projections 24 defining cylindrically formed grooves.

[0044] Finally, Figure 9 shows the metallic section 20F provided at one edge with a dovetail groove 21 and at the other edge with a U-shaped groove 28 provided with the outstanding step 29, which is for use in the formation of the upper and lower walls 5 and 6 and the end caps 7.

[0045] Figure 10 shows the configuration of the right cross section of the guide rail 4 and of the support section 12.

[0046] The guide rail 4 of the blind 3 is tubular and comprises strong members or plates 13 for engagement with the end caps 7. The members 13 are attached to the guide rail 4 by means of two L-shaped tabs 31, the concave portions of which face each other. A C-shaped groove 32 aids in the engagement of the guide rail 4 and the support section 12, and for housing and guiding the chains (not shown) of the blind, there is an outstanding tab 33 (provided with a slot 34 for the attachment of a sliding strip), and a corner 35 of the tubular body.

[0047] The support section 12 is formed by the association of an inner section 12A and an outer section 12B by means of two insulating sections 14 to produce interruption of the thermal bridge. The outer section 12B is provided with two barbed tabs 36 which mate with the C-shaped groove 32 of the guide rail 4, in which they are engaged. The support section 12 is anchored to the aperture 37 of the building by means of a metallic frame 38.

[0048] The supporting box 1 is constituted by a body formed, as seen in Figure 11, by the association of an upper

wall 5, a lower wall 6, a side wall 8 and a cover 9, not shown in this Figure. The box is closed at the ends thereof by the end caps 7, such that, with the exception of the cover 9, the remaining parts are formed by two or more metallic sections 20, using the complete original width thereof or only a part thereof, by cutting them, possibly inserting a single insulating section 14 between each pair of sections forming the upper and lower walls 5 and 6 and the end caps 7, as a thermal bridge interruption arrangement.

[0049] Each end cap 7 is provided with two bevelled engagement edges 7a and 7b for engagement with the upper and lower walls 5 and 6, which are matingly bevelled, a smooth centre zone 39 for locating a jamb member 40 for the shaft of the roll-up axle 2, and holes 41 in the periphery thereof, in mating engagement with the ribs 24 defining cylindrically formed grooves in the upper, lower and side walls 5, 6 and 8, for attachment by means of screws.

[0050] The cover 9 is preferably made from insulating material and, to prevent the passage of air, engages the corresponding outstanding steps 29, with the inclusion of a resilient sealing section 10, as may be seen in Figures 1, 2, 3, 12 and 13.

[0051] Since there are two different sizes of box 1, one for windows and the other for balconies, and two roll-up arrangements, inward and outward, it happens that with the sections described, it should be possible to produce any of the four types of box 1 required.

[0052] Herein after there is described the way of obtaining such four boxes 1, using the metallic sections described:

Roll-up system				
	Inward	Inward	Outward	Outward
	Window	Balcony	Window	Balcony
Upper wall	(Cb + Ac)	(Ca + Ac)	(Ab + F)	(Aa + F)
Lower wall	(Cb+Da)+Db	(Ca+Da)+Db	(F+Da)+Bb	(F+Da)+Ba
Side wall	Eb	Ea	Eb	Ea
End caps	(Cb + Ac)	(Ca + Ac)	(Ab + F)	(Aa + F)
Note: The sections indicated in brackets are connected by the insulating section 14 for interrupting the thermal bridge.				

[0053] In Figures 12 and 13 there is contemplated the inclusion of metal carpentry CM, shown by an outline in phantom line, which may be of any type and, in spite of the name, of any material (aluminium, plastics, wood or any combination thereof).

[0054] The guide rails 4 and the support sections 12 thereof may be of a different colour and the former may be double for use on wide apertures or when these must be divided into two or more openable apertures. Likewise, the guide rails 4 may be longer in plan view.

[0055] With the arrangement of the metallic sections 20 as described, it will be seen that with only six extrusion dies, twelve different sections may be produced for the formation of the box 1. The portions cut away from said sections may be recovered by melting down and re-extrusion.

[0056] The box 1 may be provided with thermal and acoustic insulation members in the interior thereof, occupying the inner surface of the walls and/or of the space between these and the fully rolled up blind.

Claims

1. A self-supporting structure for a roller slat blind, said structure being of the type comprising [i] a supporting box (1) having an upper wall (5), a lower wall (6), two end caps (7), a side wall (8) and a cover (9); [ii] an axle (2) for rolling up the blind, contained in said box (1); and [iii] guide rails (4) for the blind, characterised in that each of said walls (5 and 6) and each of said end caps (7) is formed by: [a] an association of metallic sections (20), each of which defines two longitudinal edges and an outer surface (16), such that the outer surfaces of the sections of one same association are substantially coplanar; and [b] by an insulating section (14) comprised between two metallic sections (20) of one same association and attached to the longitudinal edges of the metallic sections (20) between which it is situated; each of said insulating sections (14) extending between the insulating sections (14) of the adjacent walls (5, 6) or end caps (7).

2. The structure of claim 1, characterised in that said metallic sections (20) are provided with reference lines to facilitate the cutting thereof.

3. The structure of claim 2, characterised in that said reference lines consist of weakening grooves (15) formed in

said outer surface (16).

4. The structure of at least one of claims 1 to 3, characterised in that said metallic sections (20A, 20C, 20Da and 20F) are provided, at one longitudinal edge, with a dovetail groove (21) which is adapted retentively to house a longitudinal edge of said insulating section (14).

5. The structure of at least one of claims 1 to 4, characterised in that said metallic sections (20A, 20B) are provided, at one longitudinal edge, with a gripping groove (22) formed by the edge itself of the metallic section (20A, 20B) and a rib (23) in the form of an L-shaped tab.

6. The structure of at least one of claims 1 to 5, characterised in that said metallic sections (20E) are provided, at both longitudinal edges thereof, with a projection having a low barb which mates with said gripping groove (22).

7. The structure of at least one of claims 1 to 6, characterised in that said metallic sections (20B, 20D) are provided, at one longitudinal edge, with a groove (26) which opens transversally towards the outside of the section.

8. The structure of at least one of claims 1 to 7, characterised in that said metallic sections (20C, 20F) are provided, at one longitudinal edge, with a U-shaped groove which extends along the inner surface (17) of the metallic section (20C, 20F) and is extended in an outstanding step (29) forming a right dihedral.

9. The structure of at least one of claims 1 to 8, characterised in that said metallic sections (20A, 20B, 20D) are provided, between both longitudinal edges thereof, with ribs (23) in the form of L-shaped tabs provided with gripping means.

10. The structure of at least one of claims 1 to 9, characterised in that said metallic sections (20A, 20B, 20C, 20E) are provided, between both longitudinal edges thereof, with ribs (24) defining cylindrically formed grooves.

11. The structure of claim 10, characterised in that said ribs (24) defining cylindrically formed grooves, are provided with straight outstanding tabs (25) which are substantially parallel to said surfaces (16, 17) of the metallic section (20).

12. The structure of at least one of claims 1 to 11, characterised in that said metallic sections (20B, 20C) are provided, between both longitudinal edges thereof, with L-shaped guide ribs (27).

13. The structure of at least one of claims 1 to 12, characterised in that said guide rails (4) of the blind are firmly engaged with support sections (12), which comprise an insulating section (14).

14. The structure of claim 13, characterised in that said support sections (12) of the guide rails (4) are constituted by two tubular sections (12A, 12B) between which there is comprised said insulating section (14).

15. The structure of at least one of claims 1 to 14, characterised in that said upper and lower walls (5, 6), said end caps (7) and said side wall (8) are constituted by the assembly of at least two metallic sections (20).

16. The structure of at least one of claims 1 to 15, characterised in that said cover (9) is made from insulating material.

17. The structure of at least one of claims 1 to 16, characterised in that it comprises plates (13) constituting joining means between said supporting box (1) and said guide rails (4).

FIG. 1

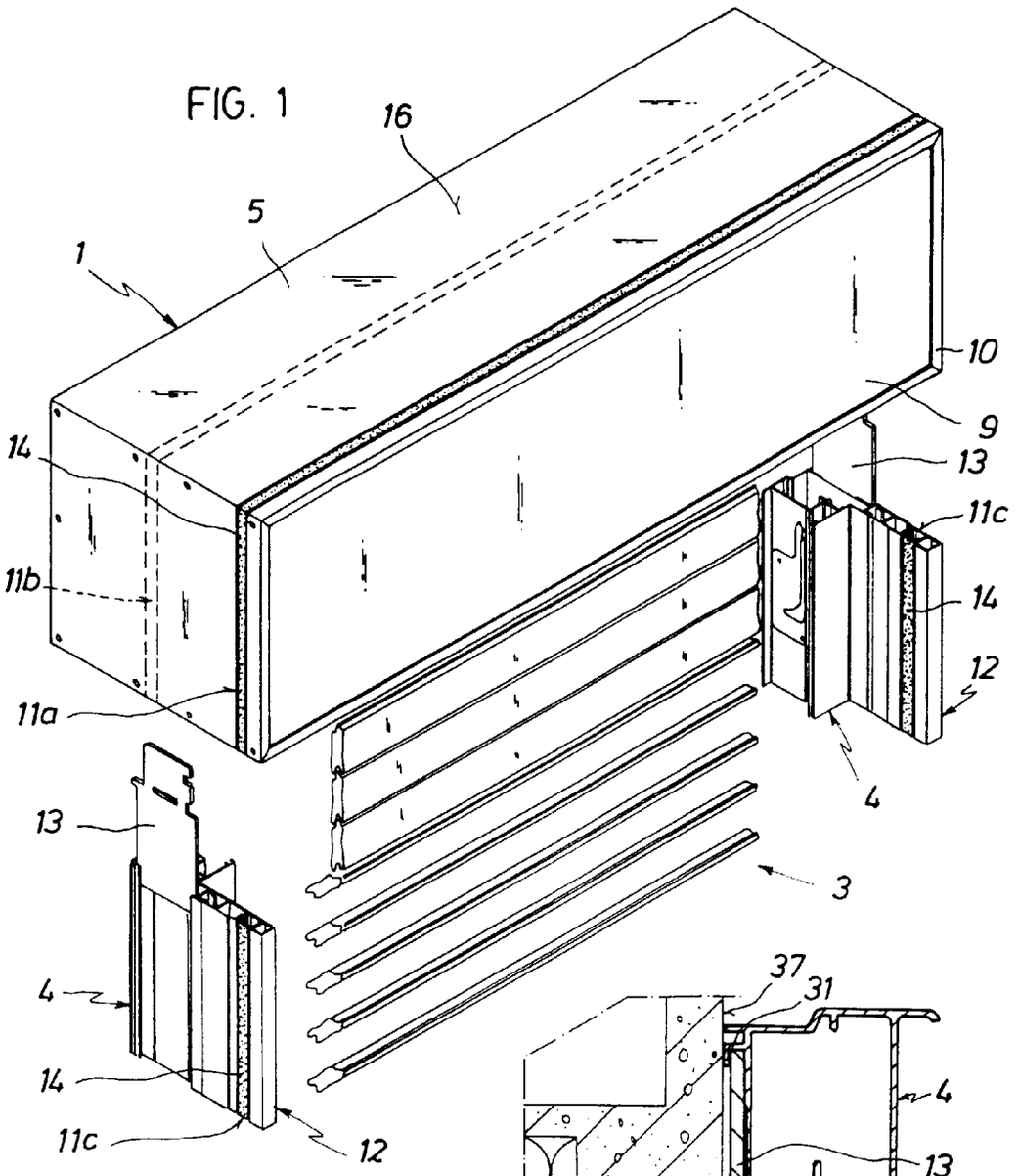
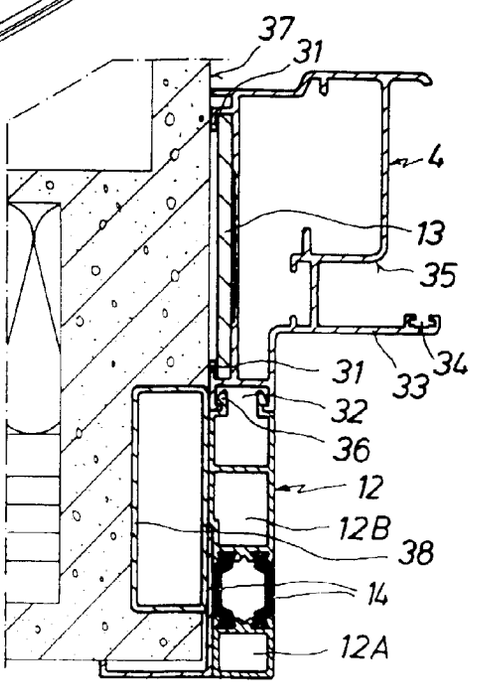

16
5
1
10
9
14
13
11c
11b
14
12
11a
4
3
13
4
14
11c
12

FIG. 10


37
31
4
13
35
34
33
31
32
36
12
12B
38
14
12A

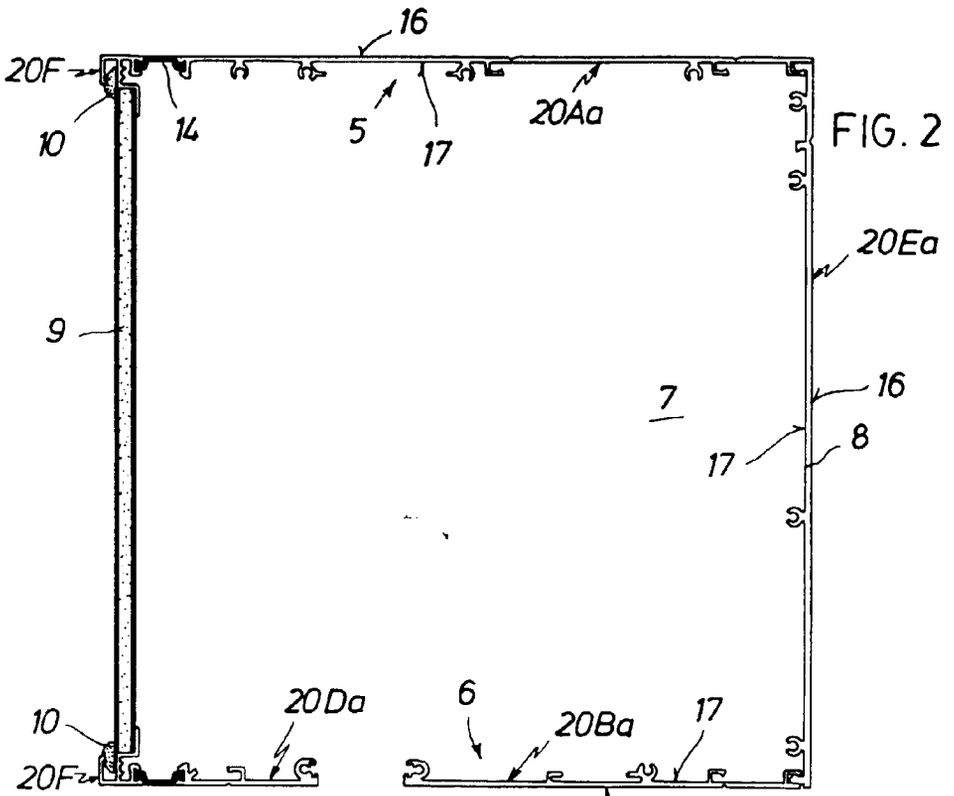
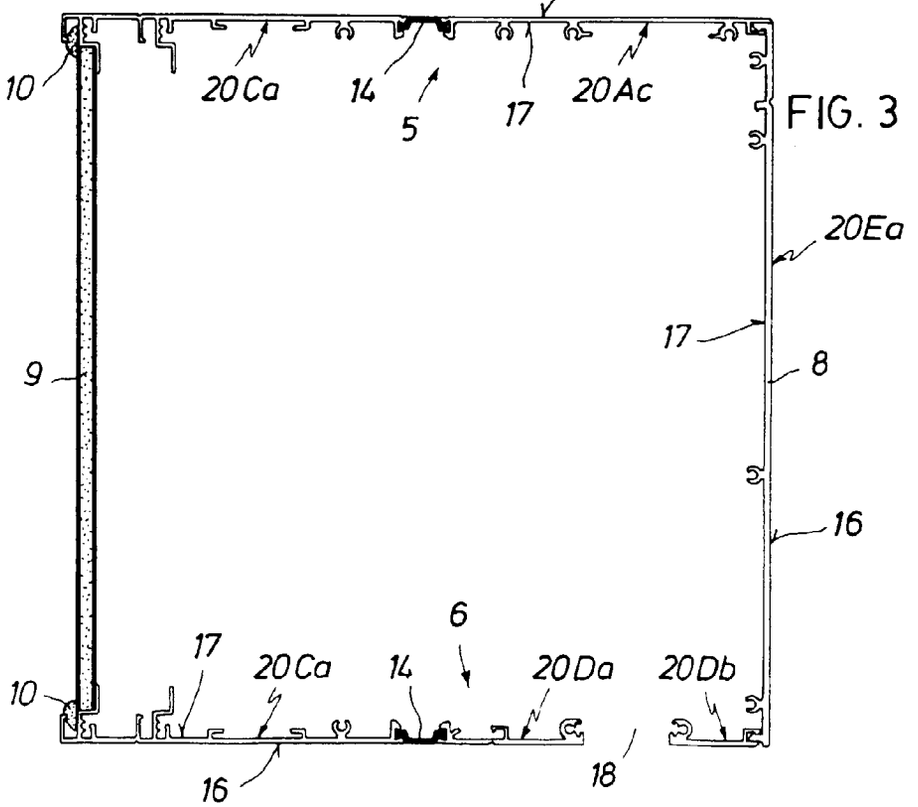

16
20F
10
14
5
17
20Aa
20Ea
9
7
16
17
8
10
20F
20Da
6
20Ba
17
16

FIG. 2


10
20Ca
14
5
17
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10
16
18

FIG. 3

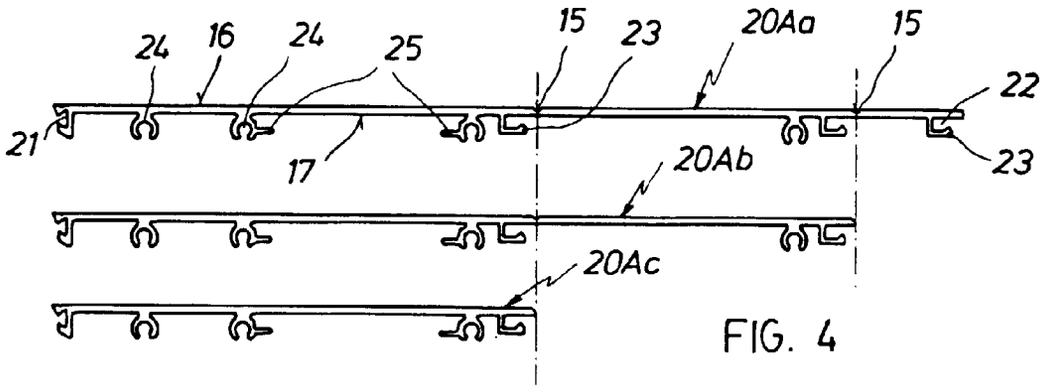


FIG. 4

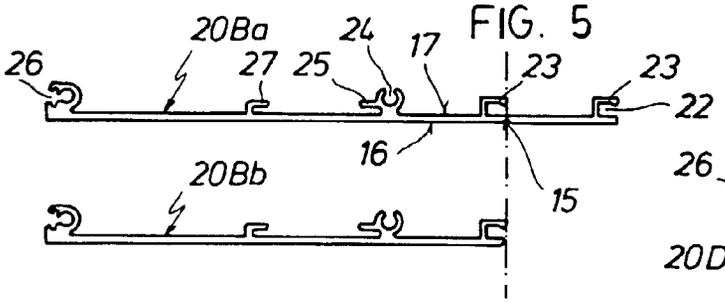


FIG. 5

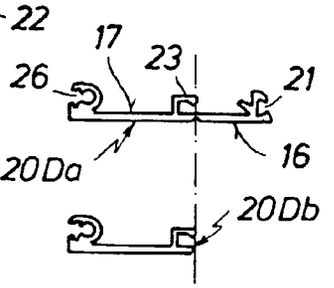


FIG. 7

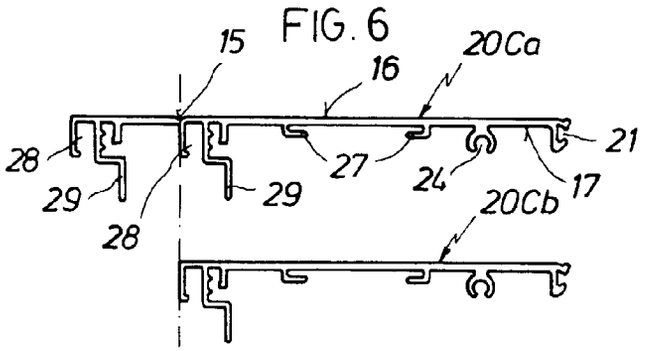
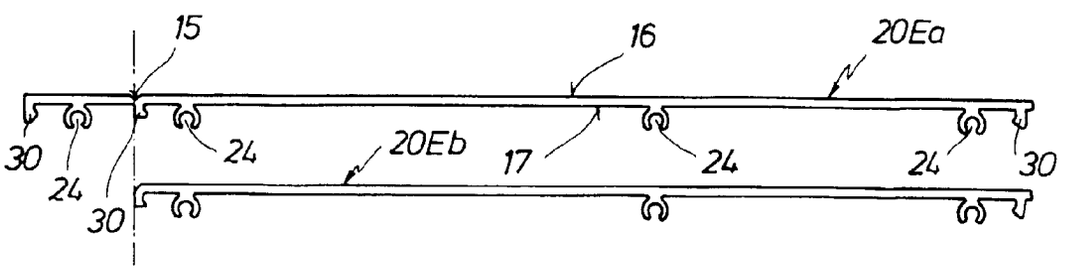


FIG. 6

FIG. 8



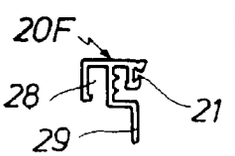


FIG. 9

FIG. 11

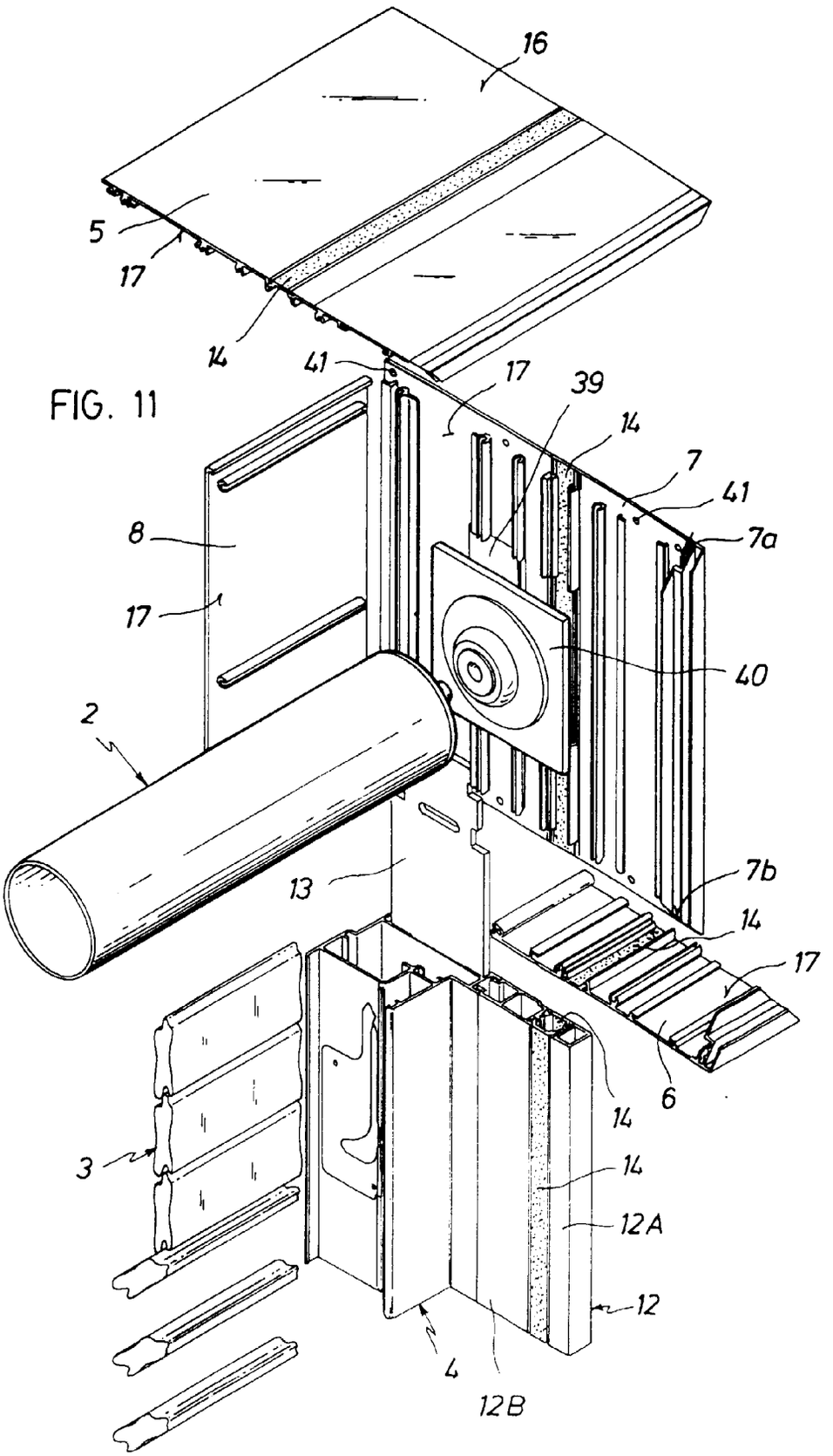


FIG. 12

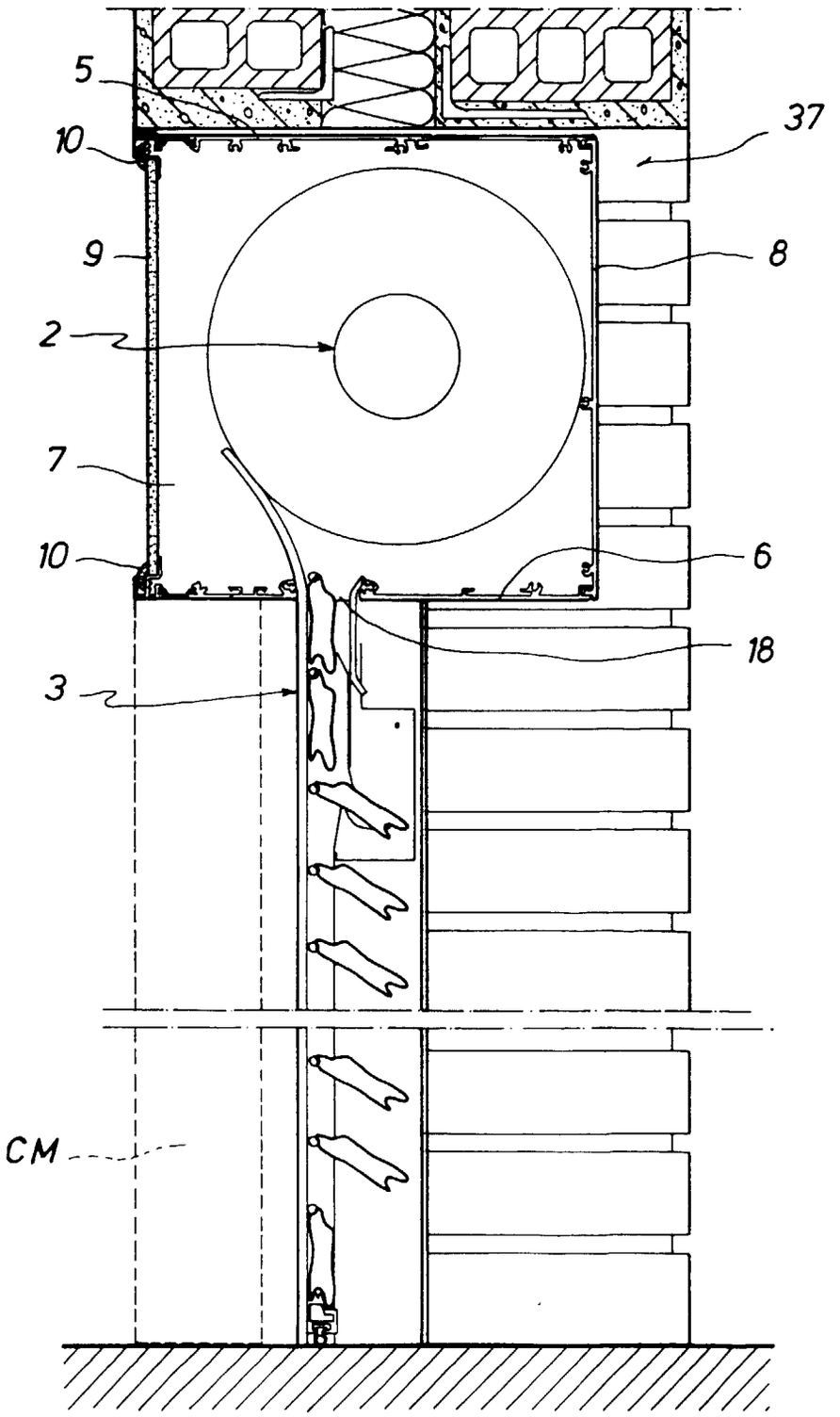


FIG. 13