(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 354 425 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
10.08.2011 Bulletin 2011/32

(51) Int Cl.:
E06B 9/17 *(2006.01)*

(21) Application number: **11386001.9**

(22) Date of filing: **10.01.2011**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **15.01.2010 GR 20100100034**

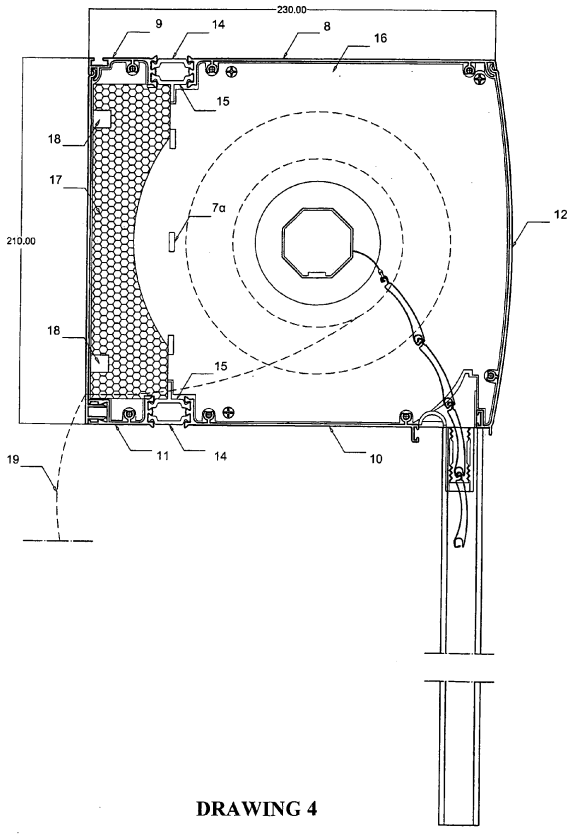
(71) Applicant: **Rola Katerins A.V.E.E.**
60062 Korinos Pierias (GR)

(72) Inventors:
- **Papakosta Efthymia**
  60100 Korinos Pierias (GR)
- **Kalamaras Evangelos**
  60062 Korinos Pierias (GR)

(74) Representative: **Panagiotidou, Effimia**
3 Aristotelous str.
546 24 Thessaloniki (GR)

(54) Aluminium box for frames rolling shutter with cast thermo block of sides and heat insulation

(57) The invention concerns aluminium boxes for frames' rolling shutter in which: a) the cast sides (rolling shutter's box caps) consist of two cast parts (1 and 2) between them is created an injection of polyamide (3), b) at the upper (8 & 9) and the lower (10 & 11) aluminium profile of the box there is a double thermo block with polyamides (14 & 15) stapled by a special press and as a result the polyamides of the profiles (upper-lower) and the polyamide (3) of the two cast sides are placed next to each other and the thermo block is continuous, c) in the internal of the rolling shutter (inside part) an insulating material (17) is placed, formed by a pantograph. The boxes are easy in usage; they have a complete thermo block in the same position and in a same distance from the space's internal as well as the thermo blocked frames are simple in assembling and in their manufacturing and heat insulated.



DRAWING 4

EP 2 354 425 A2

Description

[0001] The invention belongs to the domain field of mechanics and concerns an aluminium box for frames' rolling shutters with thermo block and heat insulation.

[0002] The invention refers to a rolling shutter box which is used for doors and windows, irrespective of dimensions, and which is manufactured by aluminium. The invention does not refer to any relative rolling shutter wrapping boxes manufactured by plastic material and which are used in countries without high sunshine such as the countries of northern Europe.

[0003] Aluminium is the material particularly used in our country and in other countries with high sunshine for frames manufacturing because it is a compact material having lots of advantages, for example resistance to temperature changes; it does not require any maintenance; it is long-lived and by several techniques (anodisation, electrostatic stain) it is painted in a variety of RAL colours and wood simulations. The same advantages are also presented to the box of the aluminium- manufactured rolling shutter which is fixed on the frames.

[0004] However, despite the above-mentioned advantages, aluminium presents the disadvantage, because of being a conductive material, to transfer indoors the outdoors difference in temperature. Thus in winter, in houses with heat insulation, huge thermal losses are appeared in alluminiums. And given also the condensing humidity, the internal surfaces of aluminium present the annoying existence of humidity and at the same time "thermo bridges" are created that transfer thermal energy from indoors to outdoors and a significant loss of internal heat. The opposite is created in the summer, and so the thermal masses from outdoors are transferred indoors having unpleasant consequences.

[0005] That technical problem existing in aluminium frames exists also in the settled aluminium rolling shutters. The term "settled" means that the box of the aluminium rolling shutter is at the top of the frame in the space between the frame and the upper window (upper profile). The solution for aluminium frames is their manufacturing by an aluminium profile which is thermo blocked by polyamide material (non conductive) and that solution is applied. Regarding the rolling shutter boxes of aluminium, the problem is even bigger because the internal surface of the rolling shutter (the visible one from inside) extends towards the entire width of the frame and its height measures from 14 to 25 centimetres as the case may be.

[0006] According to the existing state of the art several solutions of the above-mentioned problem have been proposed and specifically solutions which isolate that internal side of the aluminium box and which do not permit the transferring of the external temperature to the internal of the house, and the liquefaction of the internal air neither. Those solutions provide sometimes for simple thermo block and sometimes for thermo block in combination with heat insulation. In the sense of thermo block is meant the interruption of the continuation of the aluminium by the insertion of a material of a plastic form. One solution only with thermo block (without heat insulation) is the one proposed in Patent GR 1005126 where the block in the cast side cap (rolling shutter's cap) is created by using a plastic profile which is placed between the two parts whereas at the top and the lower profiles of the rolling shutter's box the thermo block is single. This solution however may present the disadvantage of the inadequacy of the single thermo block at the two profiles of the box to obliterate the twisting of the aluminium, whereas at the same time that system does not provide heat insulation. Moreover, given the fact that the plastic material simply it is placed between the two parts of the cast side (cap), the ultimate thermo block and the heat insulation of the box are not ensured.

[0007] One other solution using at the same time thermo block and heat insulation is proposed in Patent GR 1006080 as well as in Patent pending Application GR 20080100682, where a common approaching sense for the solution of the problem is demonstrated. The attempt of both of them lies with the fact that they add at the back side of the existing rolling shutter an additional independent compartment which self-contains an insulating material. The adding of an additional compartment is made by its screwing up to the internal side of the existing rolling shutter's box. Those common approaches are characterised by the fact that they do not provide any cast thermo block in the cast side (cap) but a simple adding of an additional compartment fixed by screwing. Furthermore, that additional compartment added by screwing at the back side of the rolling shutter is made up by many kinds of profiles, characteristic that makes those two systems unwieldy in manufacturing and placement due to their particularly high weight, as well as uneconomical. One additional technical issue that characterises the solution of the additional compartment is the difficulty in the outlet of the rolling shutter's enwrapping strap.

[0008] Finally, one other solution using thermo block and heat insulation is proposed in Patent GR 1006487, where the above-mentioned problems of the additional weight and cost of the manufacturing of the additional compartment are avoided. Nevertheless, even in that case, thermo block is created by a simple screwing of a plastic material up to the single-part cast side (cap), a solution which does not succeed the complete thermo block. In addition, the connection of the lower profile of aluminium placed onto the frame, consisted of two segments of aluminium and two polyamides, creates difficulties in the connection of its parts, in strength and durability of the system because of the form of the polyamides.

[0009] The present invention solves the above technical problems, namely the transferring of the low external temperature to the internal of the house and the liquefaction of the internal air, as it refers to a unified rolling shutter box, easy in assembling and accessible, with a complete thermo block and heat insulating material. More specifically, the present invention succeeds a complete

thermo block of the two parts of the cast side (cap) through injection and not through stapling of the polyamide. Afterwards, onto that injected polyamide and from its internal side, an autonomous accessory of polyamide is adapted which separates the space of the enwrapped strap ("wheel" in the terminology of technique), in which the external temperatures dominate, from the space beyond the thermo block and towards the internal of the house. Furthermore, this autonomous separating accessory provides a special passage opening of the strap with a spool or respectively a blocking accessory (stopper) of the opening when the rolling shutter's movement is created by electricity. Finally, the rolling shutter's box provides double thermo block by stapling to the upper and lower profile lying along the rolling shutter. The advantages of the present invention is at first that the polyamide's injection in the two cast side parts of aluminium alloy (two side caps) of the rolling shutter, provides a complete thermo block as opposed to the existing level of the technique according to which the thermo block is aimed by other already mentioned adaptation ways, such as by screwing or by collation, and so the air-tightness and the thermo block are not absolute.

[0010] One more advantage of the present invention is that it constitutes a thermo block and heat insulation system which is extremely light because, thanks to the injection, it is made up by one and only unified part of cast side, onto which the four sides of the box are screwed.

[0011] One more advantage of the present invention is that the autonomous accessory of polyamide placed onto the injected polyamide from its internal side and which separates the space of the enwrapped strap can, by a simple inversion and an opposite placing, allow the outlet of the strap (or of the wire) to the top or the underneath of the back side of the rolling shutter's accessible part, in accordance with the each time placing requirements of the frame and the power collection point.

[0012] An additional advantage of the present invention is that the double thermo block by stapling to the upper and the lower profile along the rolling shutter, provides strength to the present system and durability against the temperature changes without twisting, as well as it is easy in assembling and directly accessible.

[0013] As a result of the above lies that the present invention presents as an extra advantage the low production cost.

[0014] The four Drawings that follow the invention present briefly the followings:

Drawing 1 reflects the manufacturing way of the cast side cap. It includes 4 Figures:

Figure A depicts the two cast parts before the injection of the polyamide.
Figure B depicts isolated the form that the polyamide gets after the injection.
Figure C depicts the internal side of the cast side which after the injection becomes unified, and
Figure D depicts the external side of it.

Drawing 2 depicts the way the particular parts of the cast side (cap) and the profiles are connected.
It includes 3 Figures:

Figure E depicts the placing way of the additional separating accessory of polyamide which is depicted alone in Figure F.
Figure F depicts the additional separating accessory of polyamide which is placed at the internal side of the injected polyamide and separates the enwrapping space of the rolling shutter's strap ("wheel" in the terminology of technique).
Figure G depicts the cast side (cap) of the rolling shutter's box and its four sides as well as the connection way of the parts of the top and the bottom side of the box by the double stapling with polyamides.

Drawing 3 depicts prospectively the placing way of the plastic separating which separates the space of the rolling shutter's body movement ("blind" in the terminology of technique) from the strap's movement space (or the motor's) as well as the connection way of the plastic separating with the separating accessory of polyamide, of Figure, Drawing 2.

Drawing 4 depicts in an intersection the movement space of the blind of the rolling shutter's body and the space and placing way of the insulating material.

[0015] An example of application of the present invention follows with a detailed description and reference to the enclosed drawings.

[0016] As seemed in Figure 1, for the creation of a unified cast side part (cap) of the rolling shutter two cast segments of aluminium are used (no 1 and no 2).

[0017] In their internal part and at the exact point of the stapling by the injection of the polyamide, the two side parts bear protrusions (groves), preferably of a reverse table-form for an undisturbed and compact connection with the polyamide.

[0018] The two segments (no 1 no 2) are placed in special moulds of a plasticization machine (INJECTION) and between them a plasticised polyamide is injected with the same thickness as of the two cast segments. As depicted in Figures C and D, the final result, that is the cast side (side rolling shutter's cap) after the injection, is unified and compact whereas in its external side it is completely even. The width of the thermo block line (no 3) is the same as the width of the thermo block line of the thermo blocked aluminium frames of the market, onto which the present invention will be placed. The same is also the width of the double thermo block (nos 14 and 15) of the upper and the lower profiles of the rolling shut-

ter's box, as mentioned below with more details. To that way, it is created a complete and continuous thermo block line of the same thickness that covers along, perimetrically the entire box of the rolling shutter (side-upper profile- side - lower profile). The two cast sides (rolling shutter's caps), as already be formed, after the injection of the polyamide (3), are easy in their connection with the four sides of the rolling shutter's box.

[0019] In Drawing 1, Figure B, it is depicted the form that the polyamide of the side's thermo block gets (no 3) after the injection. It bears grooves (no 4) along its body which are useful in order for the autonomous accessory of polyamide (Drawing 2, Figures E and F, no 5) that separates the enwrapping space of the rolling shutter's strap ("wheel"), to be placed and be fixed on it and on its internal side.

[0020] As depicted in Drawings 2 and 3, the autonomous accessory of polyamide (no 5) bears grooves on its ends (no 6) which are fastened with the polyamides of the double thermo block (Figure G, no 15) whereas with the underneath the polyamide (no 5) is placed and fixed vertically to the grooves (Figures B and E, no 4) that the connection polyamide (no 3) of the cast side bears in its internal side. At the same time, on its top, the polyamide (no 5) bears tongues (Figure F, no 7a) which are fastened with the corresponding sockets (Drawing 3, no 7a) on the plastic separating (no 16) when this is screwed on the cast side.

[0021] Afterwards, as shown in Drawing 3, on the cast side (cap) and on the special sockets existing, a separating (no 16) of plastic form (non conductive) is screwed, made of ABS material (which is manufactured by a special mould using a plasticization machine). Thanks to the separating polyamide (no 5) which is fixed crossly and vertically with his underneath in the grooves (no 4) the polyamide bears (no 3) and with its top in the grooves (no 7a) the plastic separating bears (no 16), an empty space is created between the cast side cap and the plastic separating (no 16). In that space, the rolling shutter's movement mechanism (wheel, electric wires, etc) is isolated from the rest of the box in which the rolling shutter's blind is enwrapped.

[0022] On polyamide (Figure F, no 5) there are apertures (no 7) from which passes a fuse with a spool facilitating the movement of the winding mechanism's strap. When the movement is created by a motor or a gear, the empty space (no 7) of the polyamide (no 5) is blocked by a special stopper. The polyamide (no 5) isolates the space of the movement mechanism and creates an empty space at the back side of the box which is towards the internal of the house.

[0023] When, according to the frames' requirements, the outlet of the strap (Drawing 4, No. 19) is required to be from the top and not from the bottom of the back side of the rolling shutter's surface, then the polyamide (No 5) allows that function by a simple reverse.

[0024] In Drawing 2, Figure G, they are appeared the two sides of the box along the rolling shutter, the top and the bottom, where the top lean against the upper window (upper frame) of the opening and the bottom is osculated to and abut on the thermo blocked aluminium frame. Those two sides consist of two profiles each, the top side (no 8 & 9) and the bottom side (no 10 & 11). Those two pairs of profiles (8 & 9) (10 & 11) are connected to each other, each pair with two polyamides where in each pair the external (no 14) has the Ω form and the internal (no 15) the Ω-T form. Those polyamides are stapled in the special sockets of aluminium profiles by a mechanical press, so as the double polyamides to ensure a complete thermo block and at the same time to give an exceptional cooperation to each pair of profiles (pair 8 & 9 and pair 10 & 11) but also to the entire system of the box as a united and untwisted ensemble. The internal polyamide 15 has the Ω-T form in order to be able to co-operate (Drawing 3) with the side's (no 3) thermo block polyamide and with the separating (no 5) to sustain it through the respective grooves (no 6), whereas at the same time it is useful for the fixation and locking of the heat insulation material (Drawing 4, no 17).

[0025] As shown in Drawing 4, at the back side of the rolling shutter's box which is towards the internal of the house, the insulating material (no 17) is placed, of special profile formed by a pantograph in order to create the appropriate geometrical features. It bears the grooves (no 18) essential to facilitate its detachment when a rolling shutter's repair is required by any chance. That insulating material remains firm in his position in the internal of the rolling shutter and locked by the two internal polyamides (no 15, Drawing 4 and Drawing 2, Figure G) of the upper (8 & 9) and the lower (10 & 11) pair of aluminium profiles that the box bears in each cast side.

[0026] The cast polyamides (no 3) of the cast sides (of the rolling shutter's box caps) and the polyamides (pairs 14 & 15) of the upper and the lower profile of the box are placed so as the thermo block line to cover constantly and unremittingly all the four sides of the box (side-upper profile- side - lower profile) without any interruption at any point. The large width of the thermo block allows the rolling shutter box to function in combination with all the known frame thermo block systems, i.e. the thermo block of the rolling shutter box to be osculated along the thermo block, bearing the frame on which it is placed.

[0027] The entire manufacturing procedure of the rolling shutter's box is easy as of the others common rolling shutters which do not provide thermo block and heat insulation; it does not require any particular knowledge in rolling shutter manufacturing and ensures a complete thermo block and heat insulation.

[0028] All parts of the box connected with a polyamide, that is the cast sides with an injected thermo block, and the four sides of the rolling shutter's box (that is the top and the bottom which are stapled in advance both the internal and the external), are screwed as the common rolling shutter's boxes on the cast sides and thus they constitute a united, compact and untwisted ensemble (as opposed to those on which is adapted an extra part for

the creation of a heat insulation and a thermo block in existing rolling shutters which carry a twisting possibility and at the same time are considered unwieldy or to those for which a special frame manufacturing is required, as in the existing state of the art, etc.).

[0029] Therefore, as regards the present invention, the craftsman simply cuts the stapled aluminium profiles in the dimensions required by the frame and he assembles all the parts.

[0030] The present invention is used in all craft industries and industries of rolling shutter boxes manufacturing. It is applied on all aluminium frames either they are thermo blocked or not.

Claims

1. Aluminium box for frames' rolling shutter with thermo block of sides and heat insulation, **characterised by** the fact that:

   a) each side (cap) of the box is consisted of two cast parts of aluminium alloy (1 and 2) unified by a cast plasticised polyamide (3),
   b) along the entire internal side of the cast plasticised polyamide (3) an autonomous accessory of polyamide is fixed,
   c) the rolling shutter's movement mechanism space is isolated from the enwrapping space of the rolling shutter's blind by a plastic separating (16) which vertically occupies the entire cross section of the rolling shutter's box,
   d) the top and the bottom side of the box are consisted of two aluminium profiles each which are united to each other by a double thermo block of polyamide (14 & 15) stapled up to the profiles by a special press, where the internal thermo block has the T form (15),
   e) along the entire back side of the internal of the rolling shutter's box, placed in the internal of the house, there is an insulating material (17), each end of which is fixed between the plastic separating (16) existing in the left and right end of the rolling shutter and the two internal polyamides (15) of the upper (8 & 9) and lower (10 & 11) pair of aluminium profile the box bears in each cast side, and
   f) the cast polyamides (no 3) of the two cast sides (caps) of the rolling shutter's box and the double polyamides (14 & 15) of the upper and the lower profile of the box are placed next to each other so as the thermo block line to cover constantly and unremittingly all the four sides of the box (side-upper profile- side - lower profile).

2. Aluminium box for frames' rolling shutter with thermo block of sides and heat insulation according to Claim 1 **characterised by** the fact that the autonomous accessory of polyamide (5) is fixed along with its one side on the cast thermo block (3), with its ends on the internal polyamides (15) and along with its other side on the plastic separating (16), as well as by the fact that it can bear an aperture (7) with a fuse having a spool in order to contribute to the facilitation of the movement of the winding mechanism's strap (19) whereas, when the movement is created by an electrical motor or a gear, there is not any aperture (7) on the polyamide (5) or it is blocked by a special stopper.

3. Aluminium box for frames' rolling shutter with thermo block of sides and heat insulation according to Claim 1, **characterised by** the fact that the plasticised polyamide (3) is injected in such a thickness as of the thickness of the two cast segments of aluminium (1 & 2).

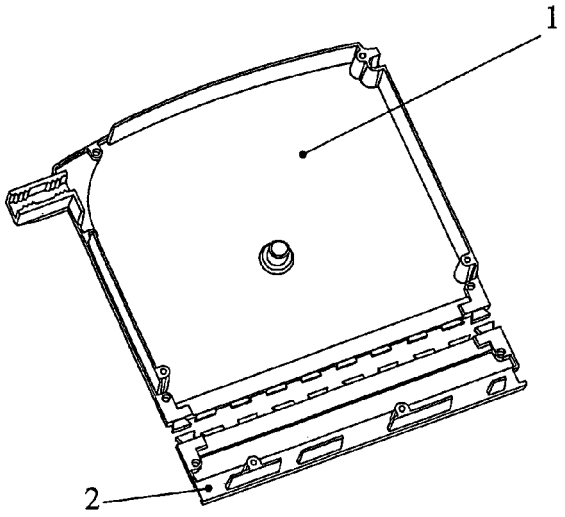


Figure A

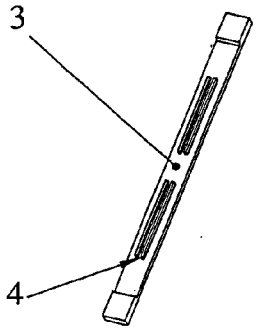


Figure B

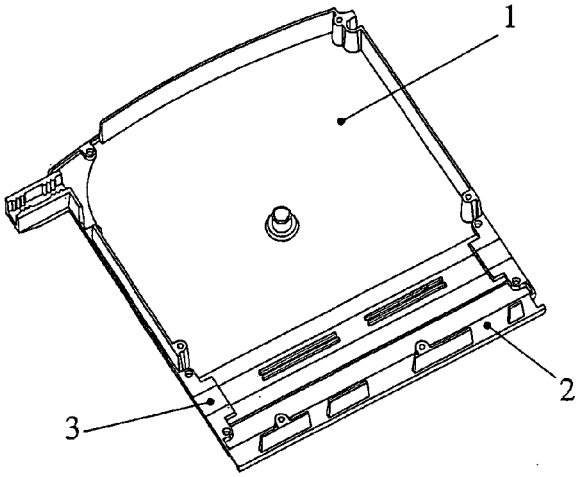


Figure C

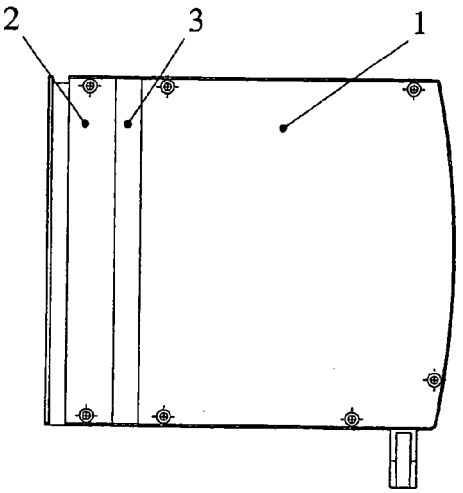


Figure D

DRAWING 1

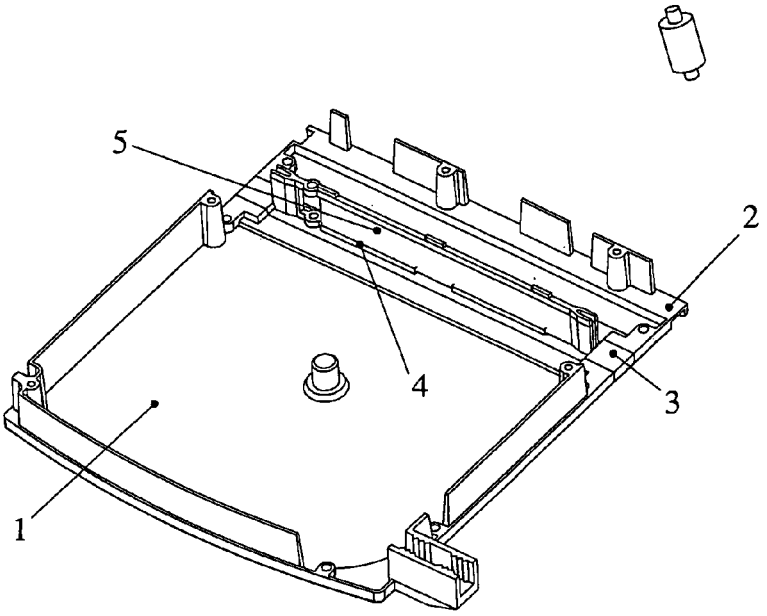


Figure E

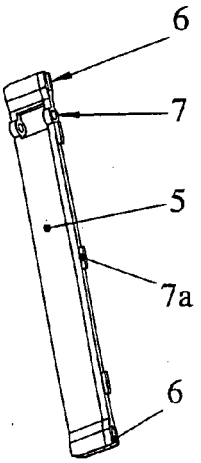
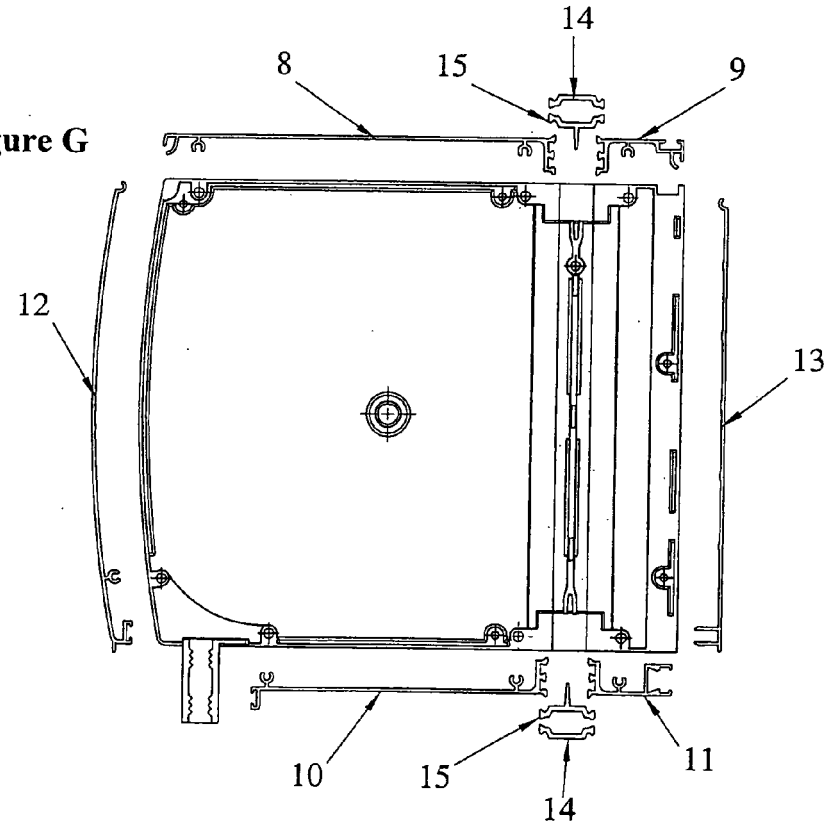
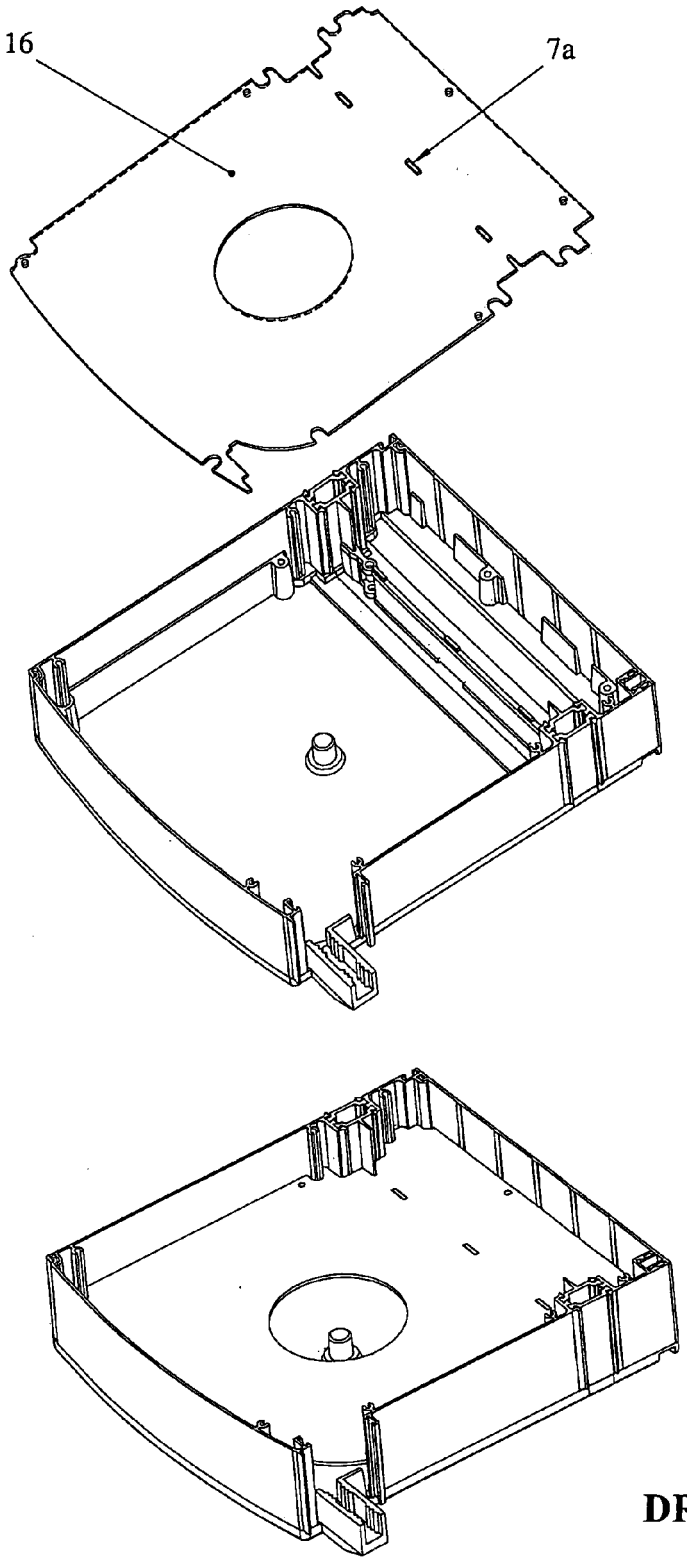


Figure F

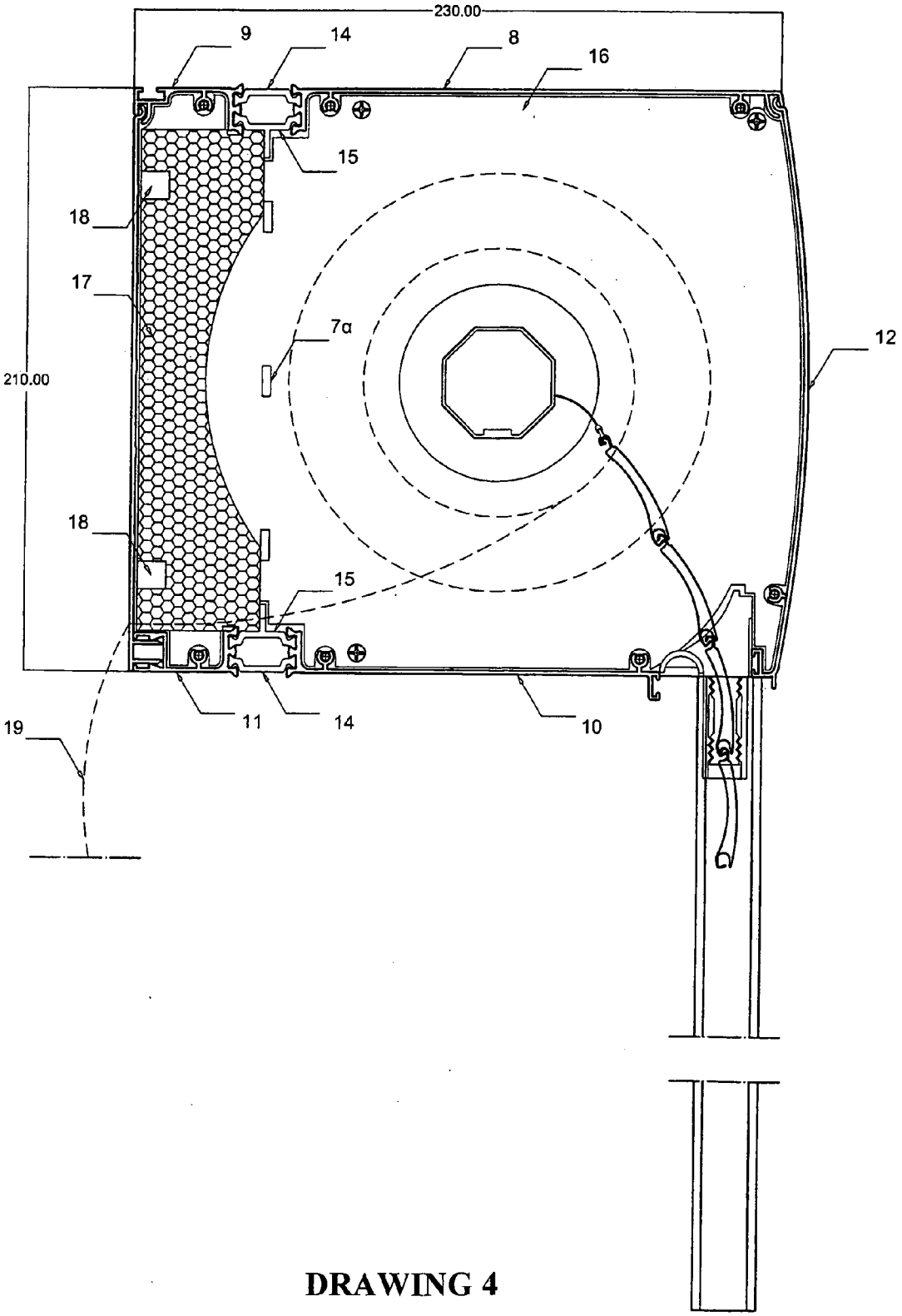
Figure G



DRAWING 2



DRAWING 3



DRAWING 4

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- GR 1005126 **[0006]**
- GR 1006080 **[0007]**
- GR 20080100682 **[0007]**
- GR 1006487 **[0008]**