(19) DANMARK

(10) **DK/EP 2940229 T3**

Patent- og Varemærkestyrelsen

(12) Oversættelse af europæisk patentskrift

(51) Int.Cl.: ***E 04 F 13/08 (2006.01)*** ***E 04 F 13/14 (2006.01)*** *E 04 F 10/08 (2006.01)*

(45) Oversættelsen bekendtgjort den: **2017-09-04**

(80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2017-05-10**

(86) Europæisk ansøgning nr.: **15159663.2**

(86) Europæisk indleveringsdag: **2015-03-18**

(87) Den europæiske ansøgnings publiceringsdag: **2015-11-04**

(30) Prioritet: **2014-03-31 DE 102014104490**

(84) Designerede stater: **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**

(73) Patenthaver: **Creaton AG, Dillinger Strasse 60, 86637 Wertingen, Tyskland**

(72) Opfinder: **Jung, Fredi Otto, Lindenstrasse 2, 35684 Dillenburg, Tyskland**

(74) Fuldmægtig i Danmark: **RWS Group, Europa House, Chiltern Park, Chiltern Hill, Chalfont St Peter, Bucks SL9 9FG, Storbritannien**

(54) Benævnelse: **Anordning til fastgørelse af hule elementer, eksempelvis på facader**

(56) Fremdragne publikationer:
EP-A1- 0 702 118
EP-A1- 1 518 997
DE-A1- 3 636 565
DE-A1- 10 321 345
JP-A- 2004 324 166

DESCRIPTION

The present invention relates to a device for laterally fastening hollow elements, for example to facades. The invention relates more particularly to fastening devices for bar-like ceramic hollow elements which are also termed baguettes.

Ceramic hollow elements of this kind can be used in very flexible ways, whether as a sight or sun screen, for forming open facades, in window areas or even as a balustrade element.

The hollow elements generally have a square, rectangular, oval or circular cross-section and can be adapted individually to any length up to generally about 160 cm.

The hollow elements can be fastened by means of fastening elements at the rear or at the side. For fastening, the hollow elements mostly have square or rectangular hollow chambers in which devices engage for fastening at the sides.

It is known to mount suspension brackets on the supporting building structure or the vertical profiles wherein these brackets serve to suspend the hollow elements with the angled suspension element fastened thereon.

One end of an angled profile is pushed into the suspension brackets and fastened there by a U-shaped clip which engages over the angled profile and the suspension bracket. The clip has noses protruding at its U-shaped ends which can be locked on the underside of the suspension bracket. A spring element is provided at the other end of the angled profile and bears by its ends against the inside wall of the hollow chamber.

The drawback with this lateral fastening is that the U-shaped clip is easily releasable and children and juveniles, in particular, can easily remove the clips. These clips are furthermore often made of plastic and age through UV

radiation. If the clips are removed or become defective this can lead to the hollow elements becoming loose from the suspension bracket and drop out in the event of a corresponding wind.

A further drawback with this fastening device is that the hollow elements can pivot about their longitudinal axis out from the desired position so that the outer sides of the ceramic elements are no longer in flush alignment. This can cause rattling noises. The fastening device must be adhesively bonded in part to the inside of the hollow elements by means of silicon adhesive.

A device is known from DE 103 21 345 A1 for laterally fastening hollow elements to facades wherein an angled supporting element which is inserted into the hollow chamber of the hollow element, is fastened to the structure by a screw.

From EP 0 702 118 A1 a curtained façade structure is known comprising horizontal support profiles which engage with play round parts of a façade plate.

The object of the present invention is to provide a device for laterally fastening hollow elements which are easy to fix, cause no rattling noises and securely fasten the hollow elements in the desired position, even in the event of strong wind pressure, so that the hollow elements can neither be turned out of the desired position nor become loose from their anchorage through wind pressure.

This is achieved in that a profiled element is provided which can be inserted into the hollow chamber of the hollow element, and a spring element is provided which has at least one spring leaf, and the profiled element can be securely connected to the second leg of the suspension and the spring element can be arranged on the profiled element in such a way that the at least one spring leaf extends along the longitudinal axis of

the profiled element.

The profiled element preferably has a square shape with a T-groove on the upward facing side into which the second leg of the suspension bracket can be latched. In this way a fixed connection is ensured between the second leg of the suspension bracket and the profiled part.

The size of the profiled part here is such that when it adjoins the upper inside wall of the hollow chamber by its upward facing outside wall it has such a spacing between its right, left and downward facing side wall and the right, left and lower inward facing wall of the hollow chamber that leaf springs can be arranged between the outside of the profile element and the inside of the hollow chamber to brace the profiled element against the insides of the hollow chamber.

The spring element is positioned so that the leaf springs extend along the longitudinal axis of the profiled element. The spring element has a centring spring action.

The leaf springs are preferably not only bent off from a metal plate which bears against one end face of the profiled element, but are also designed so that they can be supported in the fastening position also against the other end face of the profiled element. The effect of the leaf springs, a centred positioning and thus also the fixed seat are hereby strengthened.

Since the second leg can be fixedly connected to a profiled element, leaf springs extend along the longitudinal axis of the profiled element and are supported against the inside wall of the hollow chamber, the second leg is fixed securely in the hollow chamber and the hollow element can no longer be turned about the longitudinal axis and out of alignment. The square profiled element, with the preferably three leaf springs extending preferably along three outer sides thereof, then sits under the action of the three leaf springs securely fixed

in the hollow chamber of the hollow element.

In a further variation of the invention the first leg of the suspension bracket has in its end region latching tabs which - once the first leg is pushed into or through the socket of the suspension element - can be bent round by a tool so that its secure fixing cannot easily be released by either playing children nor in another way.

The suspension bracket preferably has on the second leg a tab which can be bent out from the plane of the second leg in order to lock the second leg after crossing through the T-groove with the profiled element.

The suspension bracket has lateral stabilisers/guides, a limit for the insertion depth, a depth stop and a suspension lock/security to secure against dismantling and secure against levering out.

In order to fasten the profiled element rigidly to the suspension bracket without rattling noises, the suspension has on its second leg bent-off portions which serve for a resilient fixed seat in the T-groove.

The fixed seat is further improved in that the length of the leaf spring corresponds approximately to the length of the spring element, and the height of the leaf spring corresponds to at least 40%, preferably at least 50% and more particularly preferred to at least 70% of the height of the profiled element.

The device according to the invention can be used for all possible shaped elongated hollow elements, more particularly of ceramic, insofar as these have at least a square or rectangular or similarly shaped hollow chamber into which correspondingly shaped profiled elements can be inserted with the second legs of the suspension bracket fastened thereon and with the spring element shoe placed over the profiled element.

A further advantage of the present invention is that it can be mounted easily on site by the façade builder and requires no pre-installation in an assembly workshop.

The device according to the invention is based entirely on mechanical connections, an adhesive connection is not required.

By separating the suspension bracket from the profiled element it is furthermore possible to meet individual specific requirements.

The device according to the invention is also suitable for double baguettes, lamella strips, square or rectangular pipes or other shaped hollow bodies, where these have hollow chambers into which the fastening device according to the invention can be inserted.

The device according to the invention, more particularly through the fastening of the suspension bracket on the profiled element, enables an unrestrained secured weatherproof fastening of the hollow elements without "rattling noises", with which both wind forces and snow loads as well as dead loads can be disregarded and which can also be used even in the event of severe temperature fluctuations, without volatile effects and which can also not be easily released again through unauthorised actions.

The invention and further advantageous embodiments and further developments thereof will now be explained and described in further detail below using the examples illustrated in the drawings. The features which can be concluded from the description and the drawings can be applied individually by themselves or together in any combination according to the invention.

In the drawings:

Fig. 1 shows an exploded view of the device according to the invention;

Fig. 2 shows the suspension bracket 11 pushed into the profiled part 40;

Fig. 3 shows the suspension bracket 11 in

a) a perspective view

b) a plan view from above

c) a side view

d) a plan view of the first leg 12 (viewed in the direction of arrow P in Fig. 3a);

Fig. 4 shows the spring element 50 in

a) a perspective view

b) a plan view from above

c) in side view

d) in a plan view of the end face (arrow P in Fig. 4a)

Fig. 5 shows the side view of the suspension bracket;

Fig. 6 shows the profiled element in section;

Fig. 7 shows the suspension element (at the top) fastened to a vertical strip, with a fastened hollow element (centre) and with a fastened hollow element with continuous profile as a crash guard (at the bottom);

Fig. 8 shows two differently shaped baguettes in a perspective view and in section with profiled elements in the hollow chambers.

The device according to the invention which is shown in an exploded view in Fig. 1, comprises a suspension bracket 11 which has an angled shape and comprises two legs 12, 13 which are arranged at right angles to one another. The first vertically aligned leg 12 serves to be fitted into the groove-shaped recess 21 of a suspension element 20 which can be fastened on the vertical wall 70 or substructure, and the second leg 13 serves to be positioned into a hollow chamber 81 of the hollow element 80.

The device according to the invention further comprises a profiled element 40 which can be pushed into the hollow

chamber 81 of the hollow element 80, and a spring element 50 with three spring leaves 51, 52, 53 wherein the second leg 13 of the suspension bracket 11 can be fixedly connected to the profiled element 40 and the spring element 50 is arranged on the profiled element 40 in such a way that the leaf springs 51, 52, 53 extend along the longitudinal axis L of the profiled element 40.

The suspension bracket 11 is preferably made of stainless steel, and the first and the second legs 12, 13 are formed as sheet metal strips. A part of the longitudinal edges of the second leg 13 is bent down slightly 14 to the length of the profiled element 40, which is described below, (Fig. 3) in order to secure a fixed seat of the second leg 13 in the T-groove 41 of the profiled element 40, described below, (lateral stabilizers, guide). For this the second leg 13 has at the sides two notches 17, 17' at a distance which corresponds to the length of the profiled element 40 (Fig. 3b) so that a narrow region 14 is bent down at an angle of about 45° on each of the two longitudinal sides of the second leg 13 in order to obtain a fixed non-rattling seat of the leg 13 in the profiled element 40. At the free end 15 of the leg 13 there is a tab 16 which can be bent down out from the plane of the second leg 13 to form a depth stop.

If the second leg 13 is inserted into the T-groove 41, to be described, of the profiled element 40, the T-groove 41 then presses the tab 16 during the displacement process into the horizontal plane of the second leg 13. If the tab 16 has reached the end of the profiled element 14 then, since it is no longer pressed upwards through the T-groove 41, it springs down and thus prevents the suspension bracket 11 from being drawn out of the profiled element 40.

In the fastening position the edges of the notch 17' of the second leg 13 also bear against the end face 48 of the profiled element 40, i.e. the second leg 13 is secured in the profiled element 40 both against transverse and also against

longitudinal movement and can no longer be removed from the profiled element 40 without pressing up the inner tab 16. The edge 24 of the notch 17' serves as a stop for restricting the insertion depth of the second leg 13.

The first leg 12 of the suspension bracket 11 likewise has on both downward facing edges two notches 18 so that two locking elements 19 are formed at the end of the first leg 12. After the first leg 12 has been pushed through the groove 21 of the suspension element 20 the two locking elements 19 at the end of the first leg 12 can be bent by a tool towards the hollow element 80 out from the plane of the first leg 12. As a result of the bent-round locking elements 19 the suspension bracket 11 can no longer be removed from the suspension element 20. Since a tool is necessary for bending round the locking elements 19 the elements 19 can also not be easily unlocked again by playing children and accidents are thus avoided.

The suspension element 20 (Fig. 5) is a U-shaped aluminium part. The U-shaped recess 21 then forms the socket 21 for the first leg 12 of the suspension bracket 11. Alternatively the suspension element 20 can obviously also have a square shape and comprise a full-length groove 21 into or through which the first leg 12 of the suspension bracket 11 is inserted. The transition area from the upward facing side of the suspension element 20 to the recess 21 into which the angle is inserted, is chamfered. Through this chamfer a uniform load absorption and transfer into the suspension element 20 is achieved.

The suspension element 20 is fastened by rivets or screws 23 on the wall or substructure 70 (Fig. 7).

The fastening device further comprises a profiled element 40 with two side walls 42, 43 (Fig. 6) at the lower ends of which there is a narrow web 44, 45 running at right angles to the side walls 42, 43, respectively. The webs 44, 45 are opposite one another and form a lower bearing surface ("base"). The

profiled element 40 has above the two side walls 42, 43 a T-groove 41 which serves as a guide for the second leg 13. Underneath the T-groove 41 for the second leg 13 there is a further T-shaped groove 46 into which - when required - a metal bar can be pushed to pass through the entire hollow element. The T-groove 46 can likewise serve for sliding in solid material which increases the bearing strength of the entire profiled element 40.

The downward facing side of the lower T-groove 46 merges into the two side walls 42, 43 and the side walls 42, 43 of the profiled element 40 have a step 47 at the top.

In an alternative embodiment the profiled part 40 can also have continuous stepless side walls 42, 43 from top to bottom, i.e. the side walls 42, 43 merge steplessly into the side walls of the T-groove 46 and 41.

The device further has a spring element 50 which consists of three rectangular spring leaves 52, 53, 54 bent down at an obtuse angle from three sides of a rectangular metal plate 54 (Fig. 4). The spring element 50 is pushed from below onto the profiled element 40 so that the metal plate 54 bears against one end face 49 of the profiled element 40 (Figs. 1, 2) and the three spring leaves 52, 53, 54 extend outside on the two side walls 42, 43 of the profiled element 40 and underneath the underside of the profiled element 40 with the two elongated webs 44, 45. The spring leaves 52, 53, 54 are bent slightly concave so that they have the greatest distance from each side wall 42, 43 roughly in the middle of the side walls 42, 43 (in the longitudinal direction). The leaf spring 53 lying on the open base of the profiled element 40 is bent slightly concave. The lateral leaf springs 51, 52 further have a bent-down edge 56 at their free end. The spring element 50 is preferably made from stainless steel and acts as a centring spring.

If now the spring element 50 is placed in the manner of a shoe

from below over the profiled element 40 with the suspension bracket 11 fixedly connected thereto and the latter is pushed slightly into the hollow chamber 81 of the hollow element 80 (see Figs 1, 2) then the inside 82 of the hollow chamber 81 presses the concave curved spring leaves 51, 52, 53 of the spring element 50 against the side wall 42, 43 and the angled edges 44, 45 of the profiled element 40 forming the base. Through this pressure the angled edges 56 at the ends of the lateral leaf springs 51, 52 come to bear against the end face 48 of the profiled element 40 (Fig. 1, 4b). The two spring leaves 51, 52 are thus fastened twice in the hollow element 80, on the one side against the metal plate 54 and on the other side by the angled edge 56 against the end of the leaf springs 51, 52 on the end face 48 of the profiled element 40. The spring force and the force-locking engagement are hereby strengthened. The suspension bracket 11 sits with the profiled element 40 and the spring element 50 rigidly and immovably in the hollow chamber 81, rotation or displacement is not possible, similarly also no rattling noises.

The surface area of the lateral leaf springs 51, 52 corresponds approximately to the size of the side faces 42, 43 of the profiled element 40.

If the hollow chamber 81 is to be used as a crash guard then either a profiled element 40 can be used which passes through the entire hollow element 80 (see bottom of Fig. 7). Or alternatively a full-length metal bar can be pushed in through the hollow element 80 and can be positioned in the lower T-groove 46 of the profiled element 40.

The fastening device according to the invention can be used for differently shaped hollow elements 80, provided these have a hollow chamber 81 in which the device 10 can be fastened.

Fig. 8 shows two further alternatives of baguettes in lamella form and Fig. 8 shows at the bottom in section the arrangement of the profiled elements 40 in the respective hollow chambers

81. As can be seen from Fig. 8 in the case of larger hollow elements 80, two or more devices 10 can also be used for fastening purposes, more particularly in the case of loaded baguettes of great weight/length.

If required, several baguettes can also be pushed onto a continuous long profiled element 40 of aluminium, wherein a partition plate should be provided between each end face of the baguettes in order to prevent scratching the ceramic.

Patentkrav

1. Anordning til sideværts fastgørelse af hule elementer (80), eksempelvis på facader, hvilken anordning omfatter:
• en vinkelformet ophængning (11) med to ben (12, 13), hvor det første ben (12) kan positioneres i en udtagning (21) i et ophængningselement (20), og det andet ben (13) kan positioneres i et hult kammer (81) i det hule element (80), og
• et fjederelement (50) med i det mindste et fjederblad (51, 52, 53), kendetegnet ved et profilelement (40), der kan stikkes ind i det hule elements (80) hule kammer (81), hvor ophængningens (11) andet ben (13) er fast forbundet med profilelementet (40), og fjederelementet (50) er anbragt sådan på profilelementet (40), at det i det mindste ene fjederblad (51, 52, 53) strækker sig langs profilelementets (40) længdeakse.

2. Anordning ifølge krav 1, kendetegnet ved, at profilelementet (40) har en T-not (41), i hvilken det andet ben (13) kan bringes i indgreb.

3. Anordning ifølge krav 2, kendetegnet ved, at ophængningen (11) har en låselaske (16).

4. Anordning ifølge et af de foregående krav, kendetegnet ved, at bladfjederen/-fjedrene (51, 52, 53) er afkantet fra en metalplade (54), der kan positioneres på en frontflade (49) af profilelementet (40), og enden eller enderne af bladfjederen/-fjedrene (51, 52, 53) i fastgørelsespositionen desuden er understøttet på den anden frontflade (48) af profilelementet (40).

5. Anordning ifølge et af de foregående krav, kendetegnet ved, at ophængningens (11) første ben (12) har låsningselementer (19), med hvilke der kan ske en låsning af ophængningen (11) i et ophængningselement (20), der er fastgjort på en underkonstruktion eller væg (70).

6. Anordning ifølge et af kravene 2 til 5, kendetegnet ved, at ophængningens (11) andet ben (13) har afkantninger (14) for at fastspænde det andet ben (13) i profilelementets (40) T-not (41).

7. Anordning ifølge et af de foregående krav, kendetegnet ved, at ophængningen (11) har et dybdeanslag (24) med henblik på korrekt positionering.

8. Anordning ifølge et af de foregående krav, kendetegnet ved, at bladfjederens (51, 52, 53) længde omtrent svarer til profilelementets (40) længde, og bladfjederens (51, 52, 53) højde svarer til i det mindste 40 %, fortrinsvis i det mindste 50 % og særligt foretrukket i det mindste 70 % af profilelementets (40) højde.

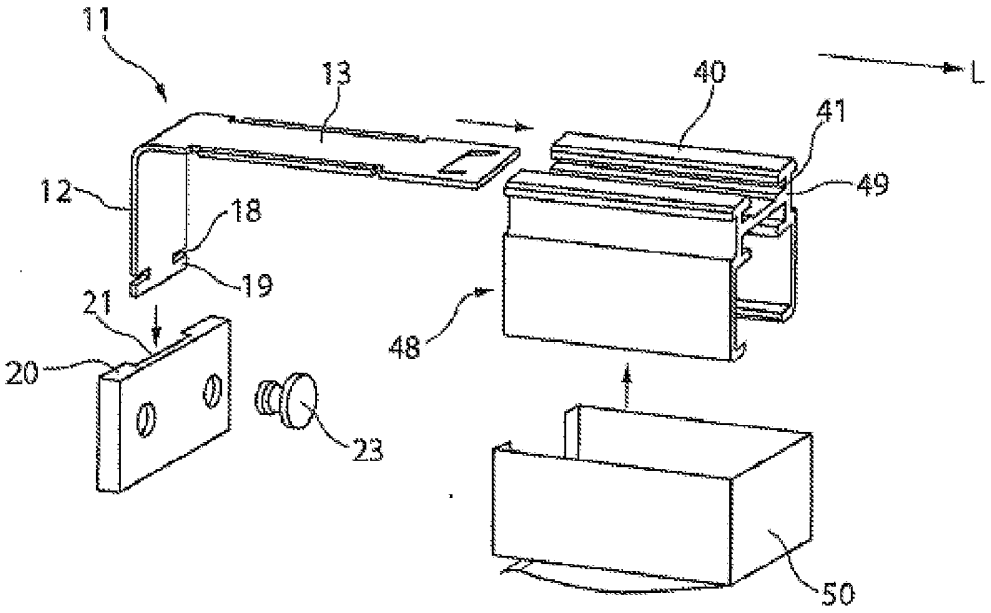

Fig. 1

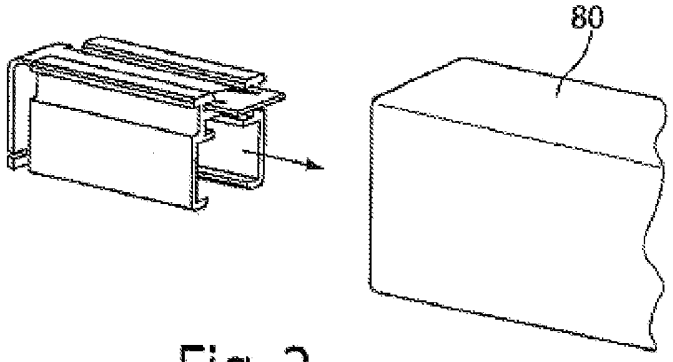

Fig. 2

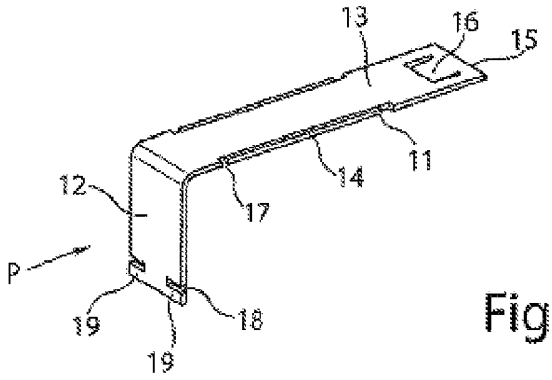

Fig. 3a

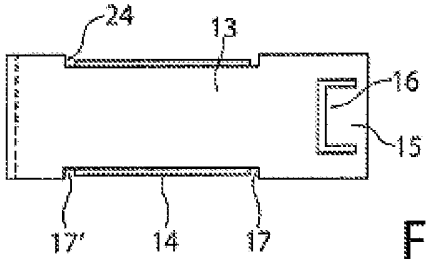

Fig. 3b

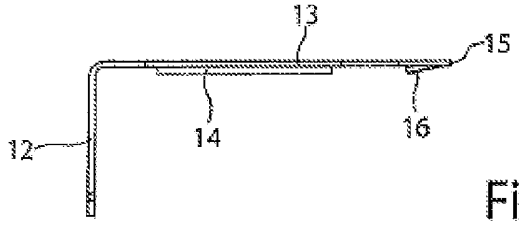

Fig. 3c

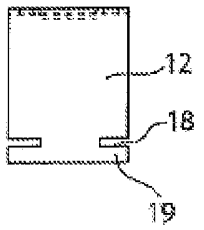

Fig. 3d

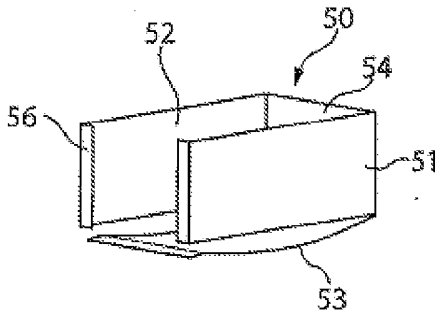

Fig. 4a

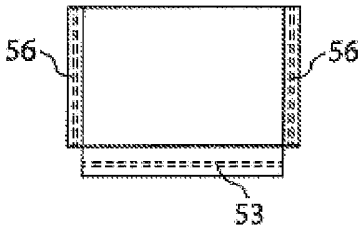

Fig. 4d

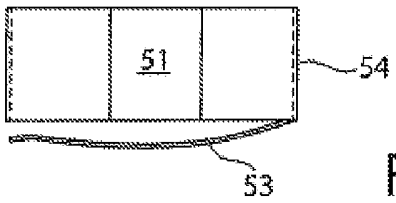

Fig. 4c

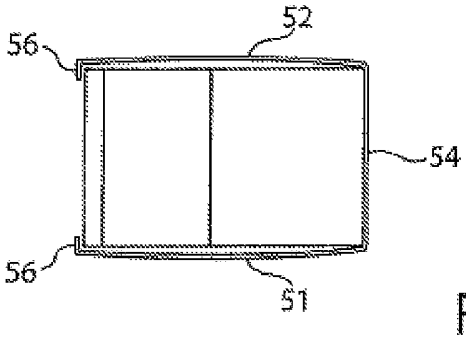

Fig. 4b

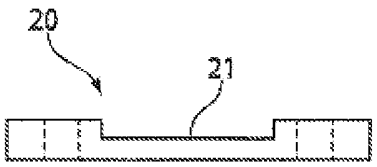

Fig. 5

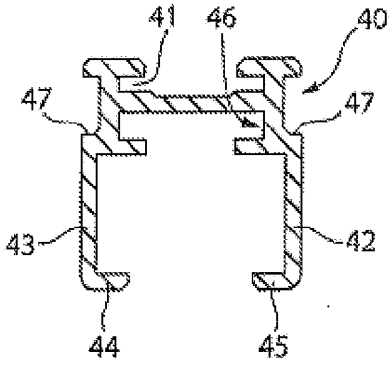

Fig. 6

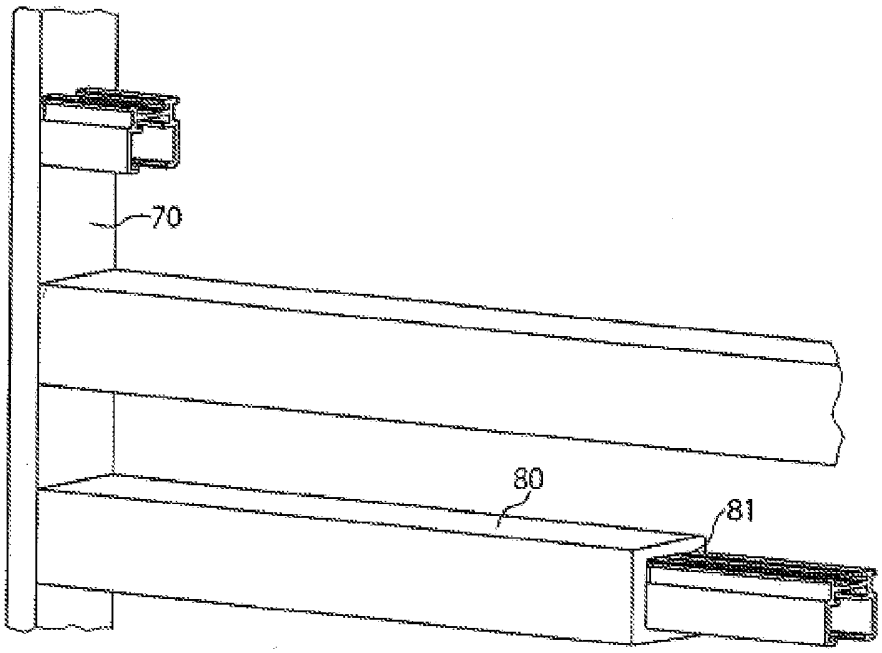

Fig. 7

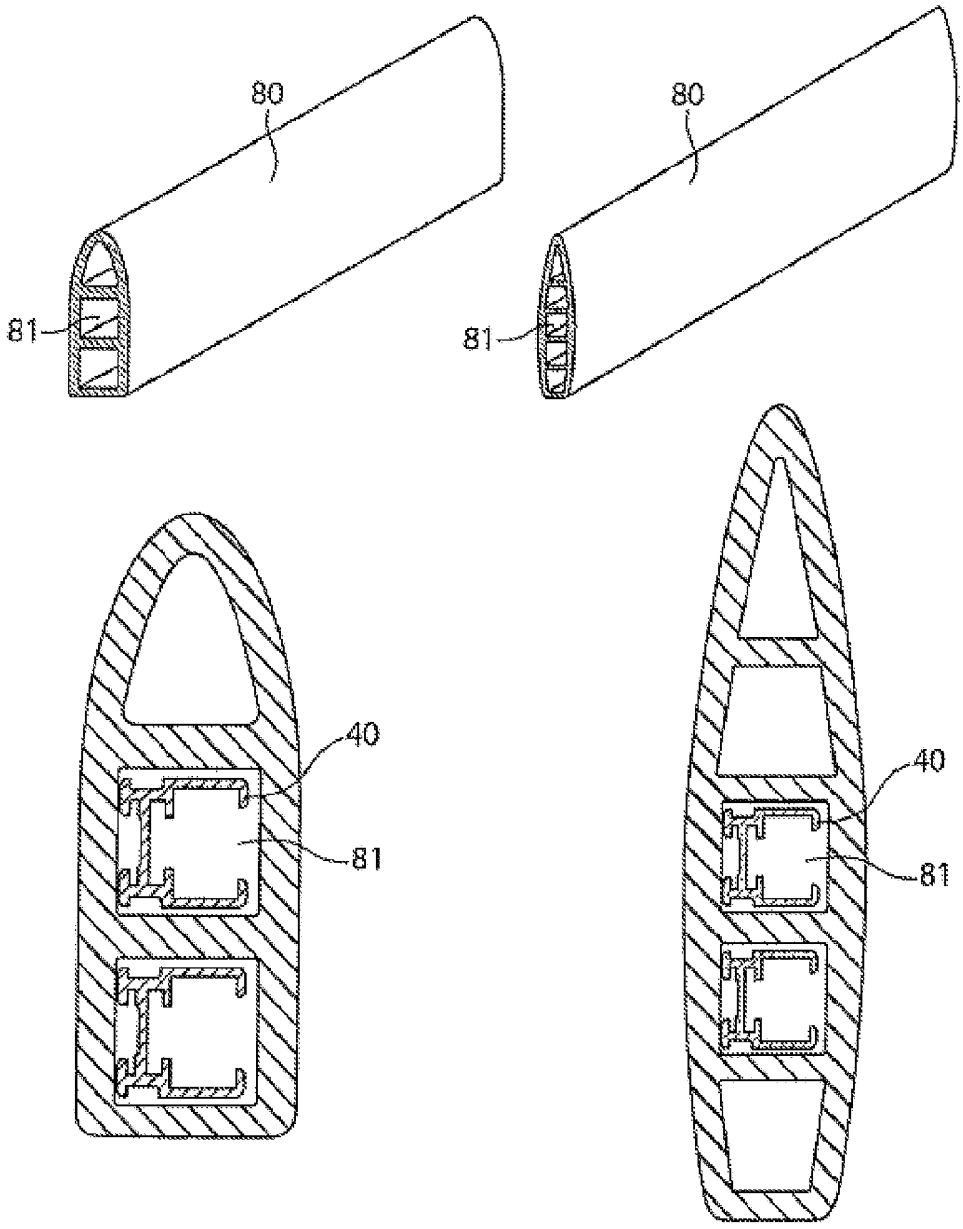

Fig. 8