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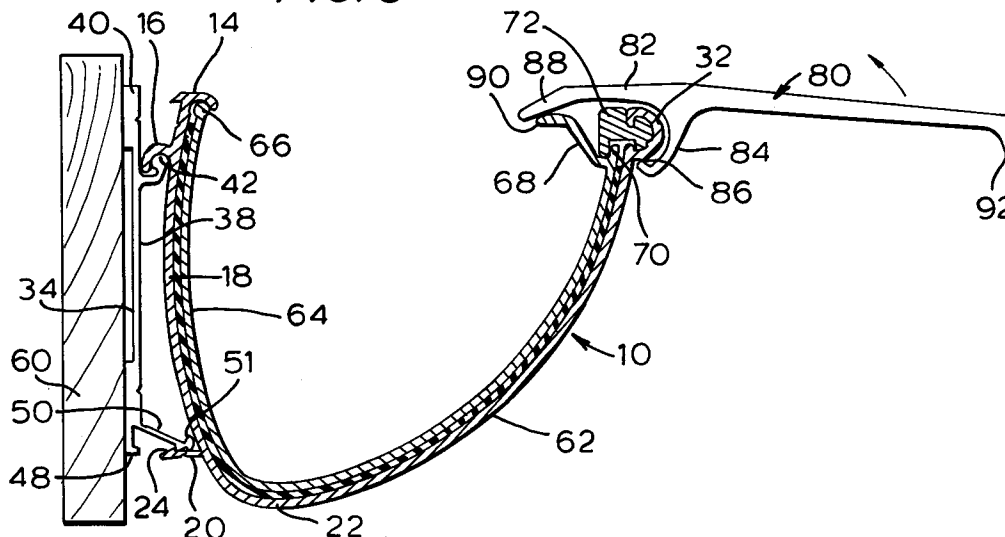
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Holborn London WC1V 7OF(GB)(54) **Gutter systems.**

(57) A rainwater gutter system has lengths of gutter (10) each having an integral, longitudinally extending, outwardly directed mounting rail (16) projecting from the rear wall (18) thereof, brackets (34), for attachment to a building (60), each having at least one lug (36) configured to engage the gutter mounting rail; gutter retaining features (20, 50) provided on the gutter and brackets, that positively interlock one with the other upon transversely of the longitudinal axis of the gutter upon rearwards movement of the

gutter towards the brackets; each gutter has at least one projecting integral hook (14), and gutter lengths are joined together by an essentially rigid joining clip (64) shaped to fit within the gutter and having a rim portion (66) configured to engage the gutter hook, locking means (74) are provided to engage one gutter rim (30) and the other clip rim (70) to lock the clip in position when it is fitted within the abutting ends of a adjacent gutter lengths.

FIG. 8

This invention relates to rainwater gutter systems to be attached to buildings.

Its object is to provide a system that is easy to fit and which has a pleasing appearance with the attachment brackets and joining clips mostly hidden from view.

One rainwater gutter system, sold by Alifabs Limited under the trade name "Ambassador", comprises lengths of extruded aluminium guttering having an outturned rear rim that clips over the top edge of a fixing bracket; a flange extending rearwards from the rear wall of the gutter overlies a flange extending forwards from the fixing bracket. The gutter lengths being fixed in place by drilling and then screwing the two flanges together. The gutter is designed to mask the brackets from view and thus fixing the gutter to the bracket is complicated by having to locate each bracket prior to drilling screw holes through the gutter and bracket flanges; itself a lengthy process. This manner of fixing also creates thermal expansion problems as it does not permit the gutter to expand or contract with respect to the brackets. The gutter lengths also have inturned lips just beneath their front and rear edges and lengths of gutter are joined together by a "spigot", of the same general section as the gutter, that is compressed within the gutter ends against a length of neoprene gasket, bonded to each gutter end; a "G" clamp being used to force the spigot into the gutters until the rims of the spigot engage under the gutter lips. Clearly this method of joining gutter lengths is cumbersome and lengthy; especially for 4 meter long lengths of gutter weighing 10 or 18.8 kilograms. Removal of a spigot is stated to be by "using two large screwdrivers and levering the spigot from under the lip on the front edge".

Another rainwater gutter system sold by Blackburns (London) Limited under the trade name "Stormaster" has a similar bracket mounting system to that Alifab's with a fixing clip engaging under an outturned gutter rear rim and a flange extends downwardly and then rearwardly from the rear wall of the gutter to engage a complimentary shaped flange on the fixing clip; there is no apparent provision for positive engagement between the gutter and fixing clip flanges. Lengths of gutter are joined together by an internal sleeve engaging under inturned rims of the gutter and located by bolts between each gutter length and the sleeve.

It is an object of the present invention to provide a rainwater gutter system that is simple to attach to building and simpler to join together than either of the aforementioned systems.

According to one aspect of the present invention, a rain water gutter system for attachment to a building comprises:-

lengths of gutter, each having an integral, lon-

gitudinally extending, outwardly directed mounting rail projecting from the rear wall thereof;

brackets, for attachment to a building, each having at least one lug configured to engage the gutter mounting rail; and

gutter retaining features provided on each gutter length and each bracket, the features being designed to positively interlock one with the other transversely to the longitudinal axis of the gutter upon rearwards movement of the gutter towards the brackets.

Thus, the attachment brackets can be aligned and attached to a building, guttering lengths being simply hung on the brackets, where they will be supported whilst the level of the gutter is checked and, if necessary adjusted; thereafter, the gutter lengths can be locked into position on the brackets. No additional fixings, such as by screwing between the gutter and the bracket, as required. Also, the interlock permits the gutter to longitudinally expand or contract with respect to the brackets.

In an embodiment of the present invention, the gutter mounting rail is a channel of inverted, rounded section and the attachment bracket lugs each have a rounded section that can engage the channel section to support the gutter and permit lengths of gutter to pivot longitudinally about the attachment bracket lugs.

In a preferred embodiment of the present invention, the gutter is formed with a longitudinally extending, outwardly directed retaining rail having a longitudinally extending feature proud from one surface thereof and each attachment bracket has an outwardly directed retaining flange arranged to face said surface on the gutter retaining rail; the bracket flange having a longitudinally extending proud feature complementary to the gutter retaining rail feature, whereby the features on the gutter retaining rail and the bracket retaining flange can interlock transversely to the longitudinal axis of the gutter upon pivotal rotation of the gutter. These proud features may take the form of the gutter retaining rail having a barbed cross-section and the bracket retaining flange having at least one complimentary barb. Additionally, gutter retaining rail barb can have a cam face arranged to contact a cam face on the bracket retaining flange as the gutter (10) is pivoted; the cam faces forcing the gutter retaining rail and/or the bracket retaining flange to deflect and thereby permit the barbs to pass over one another and then snap together.

According to another aspect of the present invention, a rain water gutter system for attachment to a building comprises:-

lengths of gutter, each having at least one projecting integral hook;

an essentially rigid jointing clip, shaped to fit within the gutter and having a rim portion config-

ured to engage the gutter hook; and,

locking means provided to engage one gutter rim and the other clip rim to lock the clip in position when fitted within and joining the abutting ends of a adjacent gutter lengths.

Thus, no flexing or springing of the gutter or clip is required neither is bolting of the clip to the abutting ends of adjacent gutter lengths ; this results in a simpler clip to fit and a stronger joint between gutter lengths.

In an embodiment of the present invention, the gutter lengths are each formed with a longitudinally extending, hook-shaped jointing channel formed by an inturned rim of rounded section and the clip has a rounded rim so that it can pivot longitudinally within the gutter rim. Preferably, the gutter mounting channel is shaped to permit the pivot line of the clip to move transversely within the jointing channel as the clip rotates into the gutter. This enables the clip to rotate within the gutter past any sealing gasket and still maintain a tight fit within the gutter.

In a further embodiment of the present invention, the locking means comprise an inwardly directed, longitudinally extending, locking channel formed in the other gutter rim and a locking bar, longitudinally slideable in the locking channel, to trap the other rim of the clip and bridge between the locking channels of abutting adjacent gutter lengths.

United States Patent specification No. 4631875 (Olson) discloses a gutter that has to be mounted by sliding lengthwise along the mounting brackets; whereas the present invention requires the gutter to be attached to the mounting brackets by rearwards movement of the gutter towards the brackets.

United Kingdom Patent specification No. 2083515 A (Sachs) discloses mounting bracket looping over the top of the gutter and engaging beneath the inturned front top rim of the gutter; whereas the present invention requires the mounting bracket to attach to the rear of the gutter.

The above and other features of the present invention are illustrated, by way of example, in the Drawings, wherein:-

- Fig.1 is an end elevation of a gutter length in accordance with the present invention;
- Figs 2 & 3 are, respectively, a front and an end elevation of an attachment bracket for the gutter length of Fig.1;
- Fig.4 is a detail illustrating the interlock between the gutter and the bracket;
- Fig.5 is an exploded, perspective view of a gutter length, jointing clip and locking bar, in accordance with the present invention;

Figs 6 & 7 are, respectively, a front and an end elevation of a jointing clip for the gutter length of Fig.1;

Fig.8 is an end elevation of the jointing clip being locked in position in the gutter length of Fig.7 by a tool; and,

Fig.9 is a detail illustrating the lock between the gutter and the clip.

As shown by Fig.1, a deep channel rainwater gutter 10 consists of a length of polyester powder coated aluminium extrusion having a generally asymmetric, ovoid cross-section 12. The gutter is formed with the following integral, longitudinally extending features:-

an inturned, hook-shaped rear rim 14;

an inverted, rounded section channel 16 projecting rearwardly from the gutter rear wall 18 beneath the gutter rear rim 14;

a rearwardly projecting rail 20 near the bottom 22 of the gutter, the rail having a longitudinally extending, barbed cross-section with an upwardly directed cam face 24 terminating in a barb or shoulder 26; and,

a rearwardly opening, D-section channel 30 in the front rim 32.

Figs 2 and 3 show an attachment bracket 34 consisting of a polyester powder coated aluminium extrusion of generally rectangular section and formed with the following integral, longitudinally extending features:-

an upwardly directed lug 36, projecting forwards from the bracket's front face 38 beneath the bracket top 40, the lug having a rounded lip 42; and,

a forwardly projecting flange 50 proximate the bracket bottom 48, the flange having a longitudinally extending, double barbed cross-section with a first downwardly directed cam face 52 terminating in a first barb or shoulder 54 and a second cam face 44 terminating in a second barb or shoulder 46.

The bracket 34 is also provided with a screw slot 56 in the upper portion of the bracket and a screw hole 58 in the lower portion of the bracket.

In use and for 3 metre lengths of gutter, brackets 34 are loosely fixed to a fascia 60 at 750 millimetre centres by screws in the upper screw slots 56 only. This allows the alignment of the brackets to be adjusted until all the bracket lug lips 42 are horizontal and in line. The brackets are then finally fixed in position by screws in the lower screw holes 58 and tightening the screws in the upper slots.

Gutter lengths 10 are offered up to the brackets 34 (Fig.8) so that the gutter channel or mounting rail 16 engages the bracket lug lip 42. The gutter is then allowed to pivot radially downwards,

about the lugs 42 until the gutter retaining rail cam face 24 contacts the bracket flange cam face 52. When the gutter has been checked to be in the correct horizontal position, the gutter front lip 30 is pulled down to force the gutter retaining rail 20 and the bracket retaining flange 50 to deflect and permit the barbs 26 and 54 to pass over one another and then snap together; interlocking the gutter retaining rail 20 with the bracket retaining flange 50 transversely to the longitudinal axis of the gutter. Thus thermal expansion and contraction of the gutter with respect to the bracket can be accommodated as the barbed interlock does not resist sideways movement of the gutter on the bracket. Second barbs 46 are provided to accommodate minor irregularities in the building wall to which the guttering is being attached. The bracket flange 50 preferably has a thinner section 28 proximate the bracket front face 38 to permit the bracket to flex upwards and allow the gutter barb 26 to engage the bracket barbs 54 or 46.

Also, and as shown most clearly in Figs 3, 4 and 8, bracket flange 50 terminates in a pad 51 that contacts the lower portion of the gutter rear wall 18, to provide partial support for the gutter, in addition to that provided by the gutter mounting rail 16 hanging on the bracket lugs 42.

Fig.5 shows one end 62 of a length of gutter 10 together with a jointing clip 64. Clip 64 is, again, a polyester powder coated aluminium extrusion of a complimentary asymmetric ovoid shape to that of the inner section of the gutter and is formed with the following integral, longitudinally extending features:

a rounded lip to the rear rim 66; and,

a flange 68 curving upwards and inwards from close below the clip front lip 70.

Also shown is a locking bar 72, an anodised aluminium extrusion of a somewhat keyhole-shaped section; whereof the rounded part 74 is shaped to be a sliding fit in the gutter locking channel 30 and the locking bar base part 76 can protrude into the gutter. Gutter channel 30 is provided with a small longitudinal bead 31 and locking bar 72 has a complimentary longitudinal groove 73, the bead and groove combining to prevent the locking bar from being inserted the wrong way into the gutter channel.

E.P.D.M. or natural rubber sealing strips 78 are bonded to the outer surface of the jointing clip 64.

To join two lengths of gutter together, a locking bar 72 is slide into the locking channel 30 of one gutter length (as indicated in Fig.5). Another gutter length is then positioned close to gutter end 62 with an expansion gap between adjacent gutter ends.

The clip rear rim 66 is then offered up to and engaged with the hooked rear rim 14 of each

gutter, forming a ball and socket type pivot; the hooked rear rim 14 is not of simple circular section but is of an oval section. Keeping the clip rim engaged within the gutter rims, the jointing clip is then rotated downwards, it may be necessary to apply a suitable lubricant to the sealing strips 78 to permit the clip and sealing strips to slide into the gutters. Also the clip will pivot about the rear part of the gutter rim, increasing the clearance between the clip and the gutters. Towards the end of the rotation, a tool 80 (see Fig.8) is used to force the clip into the gutters and compress the sealing strips sufficiently for the locking bar 72 to be forced along channel 30 so that the locking bar base 76 can trap clip front lip 70 and lock the two lengths of gutter and the clip together. The leading and trailing corners 71 of the clip front lip 70 are relieved to help the locking bar ride up onto the front lip.

The tool 80 is another aluminium extrusion having a reversed G-section leading end part 82; the depending part 84 of the tool engages under a bead 86 extending down from the gutter from rim 32. The leading end 88 of the tool co-operates with a curved upper surface 90 of clip flange 68 so that, when the tool is rotated in the direction of the arrow, the clip is forced into the gutter and brought forwards in the gutter rim. By this means an essentially rigid clip can be used to join gutter lengths together; resulting in a much stronger joint that is also easy to install. To remove a joint, all that is necessary is to force the locking bar away from the clip, using a hammer for example, clip flange 68 can then be used as a handle to rotate the clip out of the gutter.

The bottom of the tool 80 is shaped as a foot 92 that can fit under a bracket flange 50 and, by a camming action between the heel of the tool and the bracket, disengage the bracket barb 52 or 46 from the gutter barb 26 and free the gutter from the bracket.

The asymmetric ovoid shape of the gutter is particularly advantageous as it maintains a reasonable rainwater flow rate at low flow volume, whilst presenting a near vertical rear wall 18 to simplify the design of the bracket 34.

Whilst the present invention has been described with respect to an extruded aluminium, deep channel rainwater gutter system; it is clear that the principles of both attachment and jointing are applicable to any rainwater system. The gutter lengths, attachment brackets, jointing clips and locking bars can be manufactured from any suitable material and by any suitable method. Neither is it essential for the gutter lengths to be attached horizontally to a building, the system can equally well be applied to shallow channel gutters that have to be attached with a fall towards the downpipe.

Claims

1. A rain water gutter system for attachment to a building comprising lengths of gutter (10) each having an integral, longitudinally extending, outwardly directed mounting rail (16) projecting from the rear wall (18) thereof; and brackets (34), for attachment to a building (60), each having at least one lug (36) configured to engage the gutter mounting rail; characterised in that gutter retaining features (20, 50) provided on the gutter and brackets, the features being designed to positively interlock one with the other upon transversely of the longitudinal axis of the gutter upon rearwards movement of the gutter towards the brackets. 5
2. A gutter system as claimed in Claim 1 and further characterised in that the gutter mounting rail is a channel (16) of inverted, rounded section and the attachment lugs (36) each have a rounded section (42) that can engage the channel section of the mounting to support the gutter (10) and the gutter to pivot longitudinally about the attachment lugs. 10 20 25
3. A gutter system as claimed in Claim 2 and further characterised in that the gutter (10) is formed with a longitudinally extending, outwardly directed retaining rail (20) having a longitudinally extending feature (24) proud from one surface thereof and each attachment bracket (34) has an outwardly directed retaining flange (50) arranged to face said surface on the gutter retaining rail; the bracket flange having a longitudinally extending proud feature (54, 46) complementary to the gutter retaining rail feature, whereby the features on the gutter retaining rail and the bracket retaining flange can interlock transversely to the longitudinal axis of the gutter upon pivotal rotation of the gutter. 30 35 40
4. A gutter system as claimed in Claim 3 and further characterised in that the gutter retaining rail (20) has a barbed cross-section (24) and the bracket retaining flange (50) has at least one complementary barb (54 or 46). 45
5. A gutter system as claimed in Claim 4 and further characterised in that the gutter retaining rail barb (24) has a cam face arranged to contact a cam face (52) on the bracket retaining flange (50) as the gutter (10) is pivoted; the cam faces forcing the gutter retaining rail and/or the bracket retaining flange to deflect and thereby permit the barbs to pass over one another and then snap together. 50 55
6. A gutter system as claimed in any of Claims 2 to 5 and further characterised in that the attachment bracket (34) has at least one feature (51) located beneath the attachment bracket lug (36) and designed to meet and partly support the mounted gutter (10).
7. A gutter system as claimed in Claim 6 and further characterised in that the bracket retaining flange (50) has an extension (51) that can abut the gutter rear wall (18) and thereby partially support the gutter (10).
8. A rain water gutter system for attachment to a building comprising lengths of gutter (10), each having at least one projecting integral hook (14); and an essentially rigid jointing clip (64) shaped to fit within the gutter and having a rim portion (66) configured to engage the gutter hook; characterised in that locking means (74) are provided to engage one gutter rim (30) and the other clip rim (70) to lock the clip in position when fitted within and joining the abutting ends of a adjacent gutter lengths.
9. A gutter system as claimed in Claim 8 and further characterised in that the gutter lengths (10) are each formed with a longitudinally extending, hook-shaped jointing channel (14) formed by an inturned rim of rounded section and the clip (64) has a rounded rim (66) so that it can pivot longitudinally within the gutter rim.
10. A gutter system as claimed in Claim 9 and further characterised in that the gutter jointing channel (14) is shaped to permit the pivot line of the clip (64) to move transversely thereof within the jointing channel to permit the clip to rotate into the gutter.
11. A gutter system as claimed in any of Claims 8 to 10 and further characterised in that the locking means comprise an inwardly-directed longitudinally extending, locking channel (30) formed in the other gutter rim and a locking bar (72) longitudinally slideable in the locking channel to trap the other rim (70) of the clip (64) and bridge between the locking channels of abutting adjacent gutter lengths.

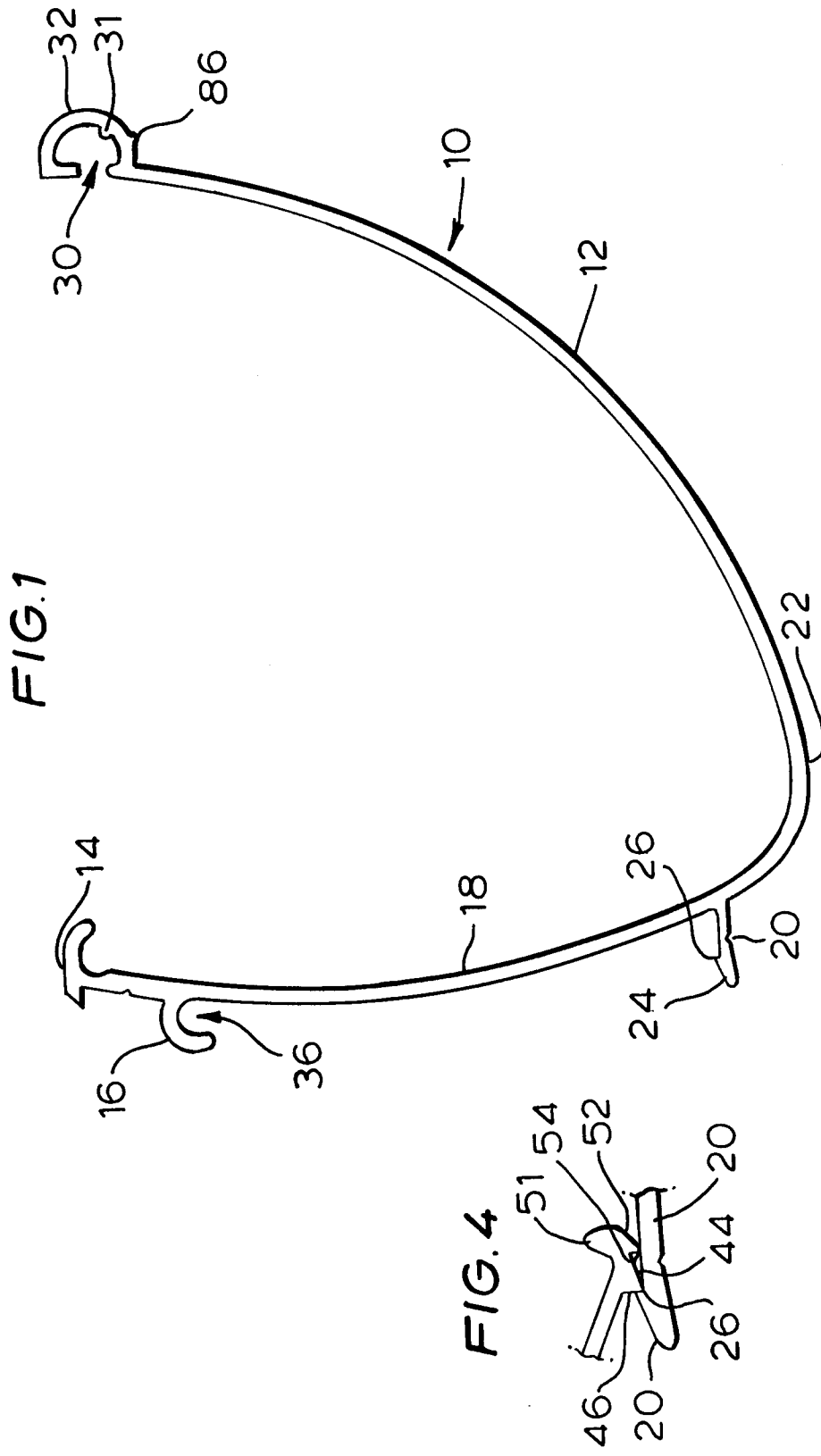


FIG.2

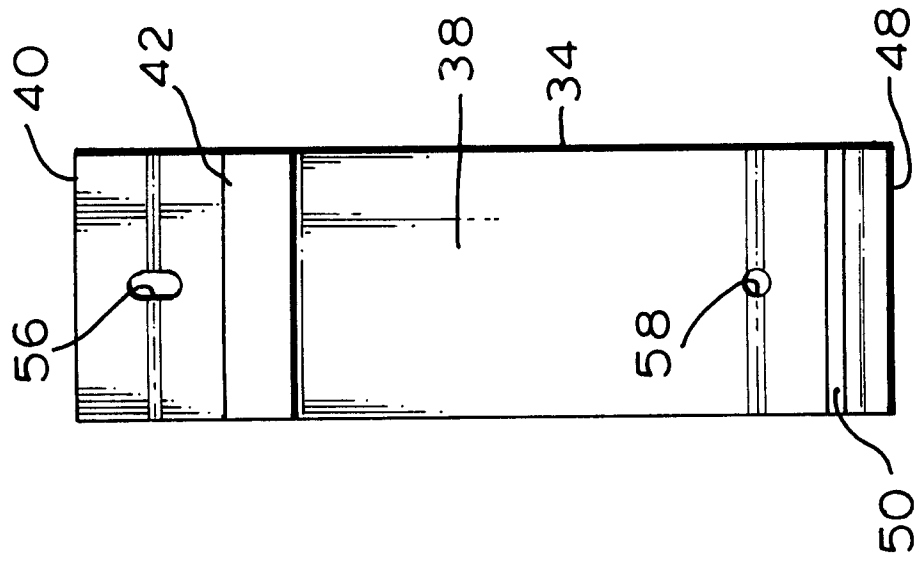
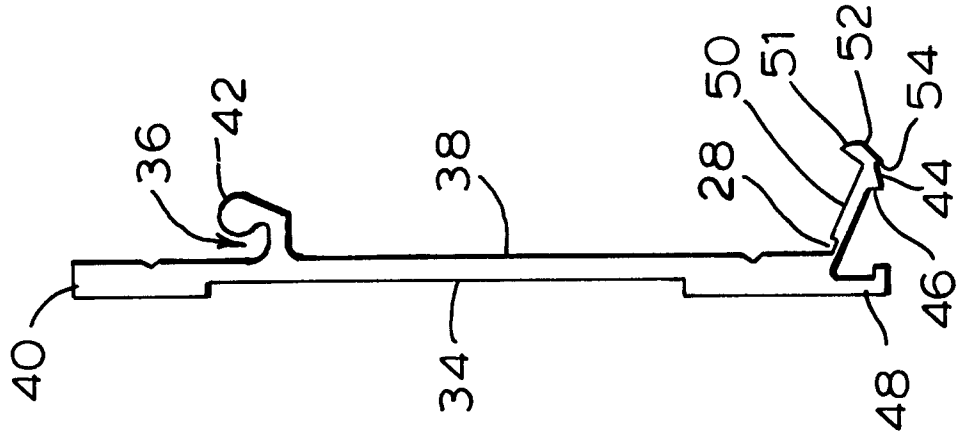


FIG.3



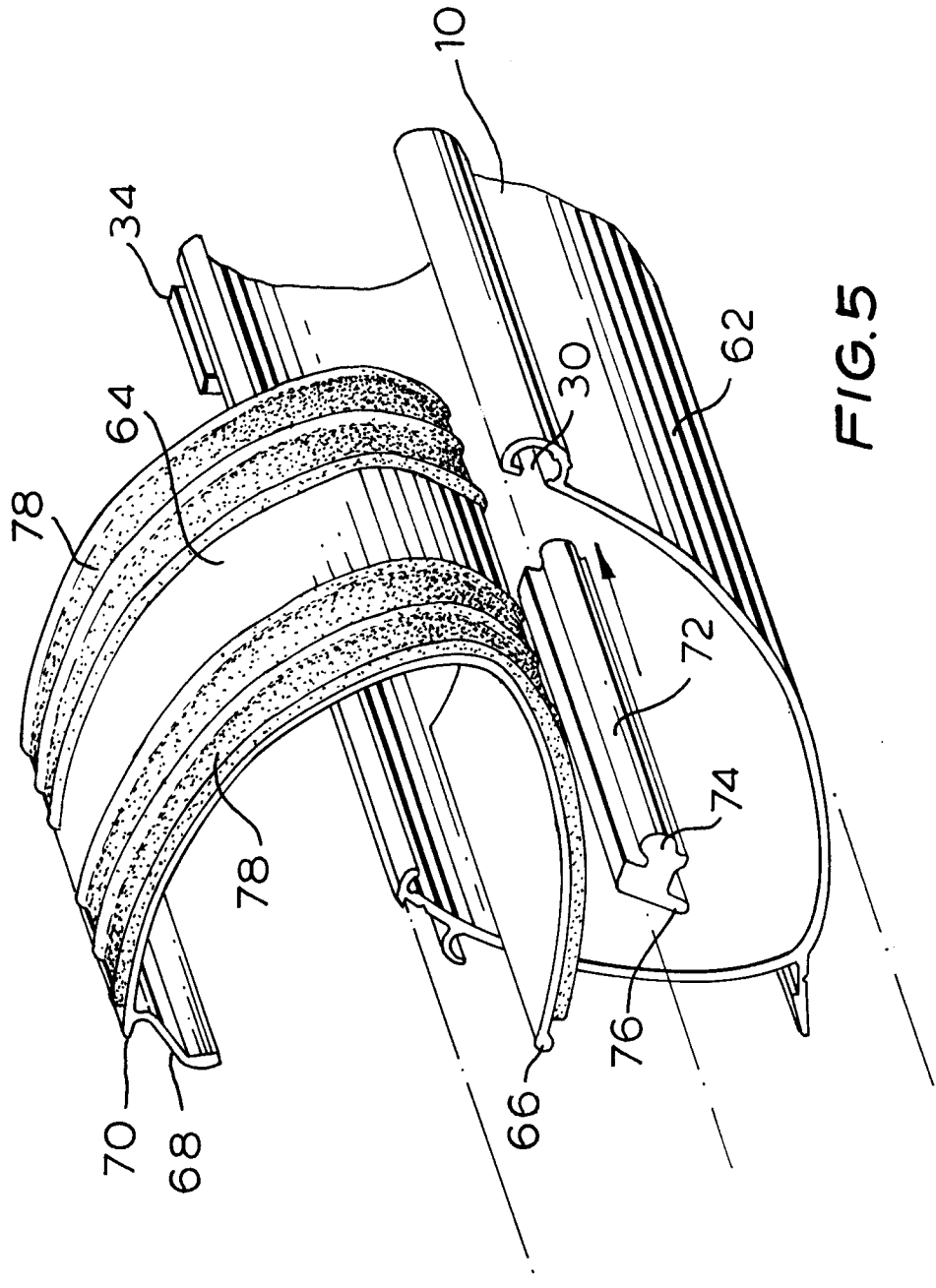


FIG. 7

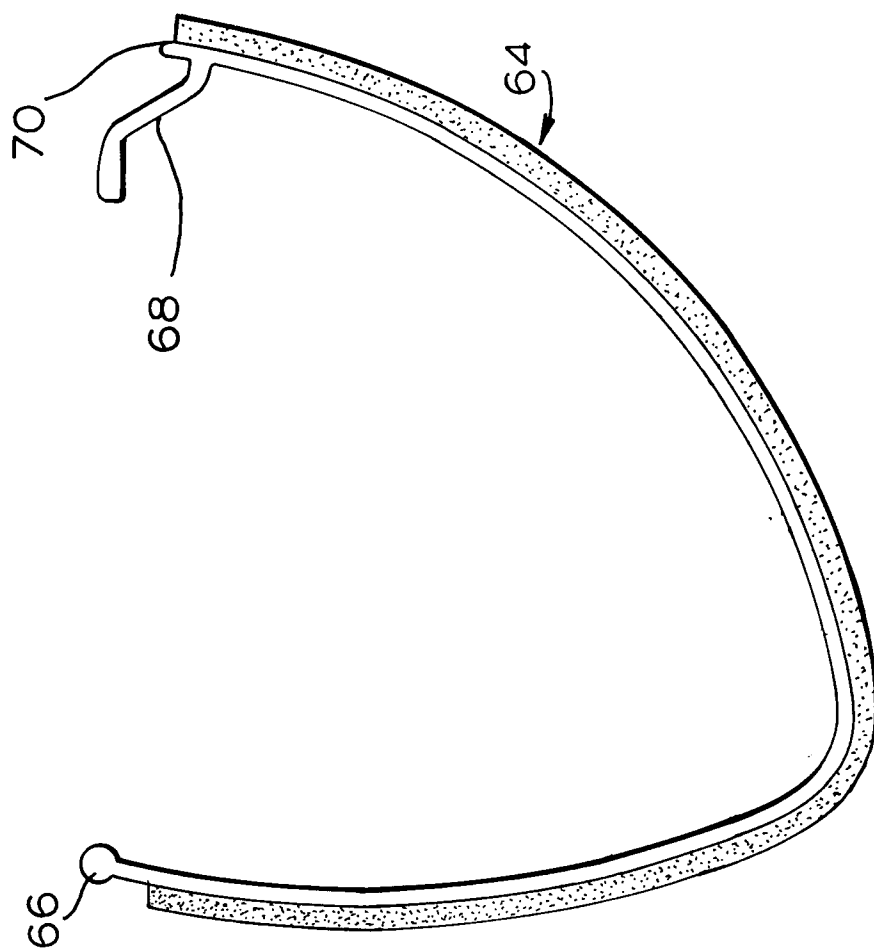


FIG. 6

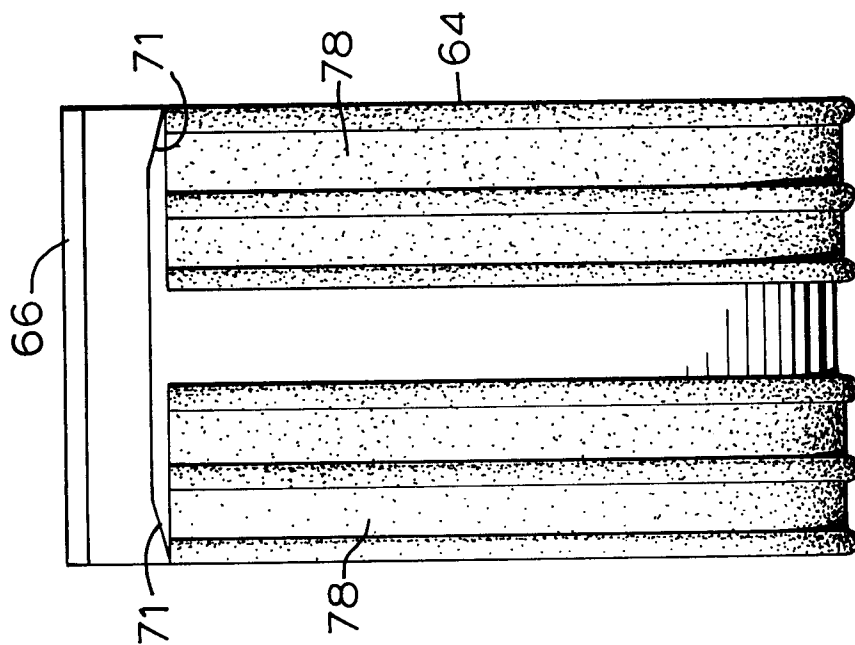


FIG. 8

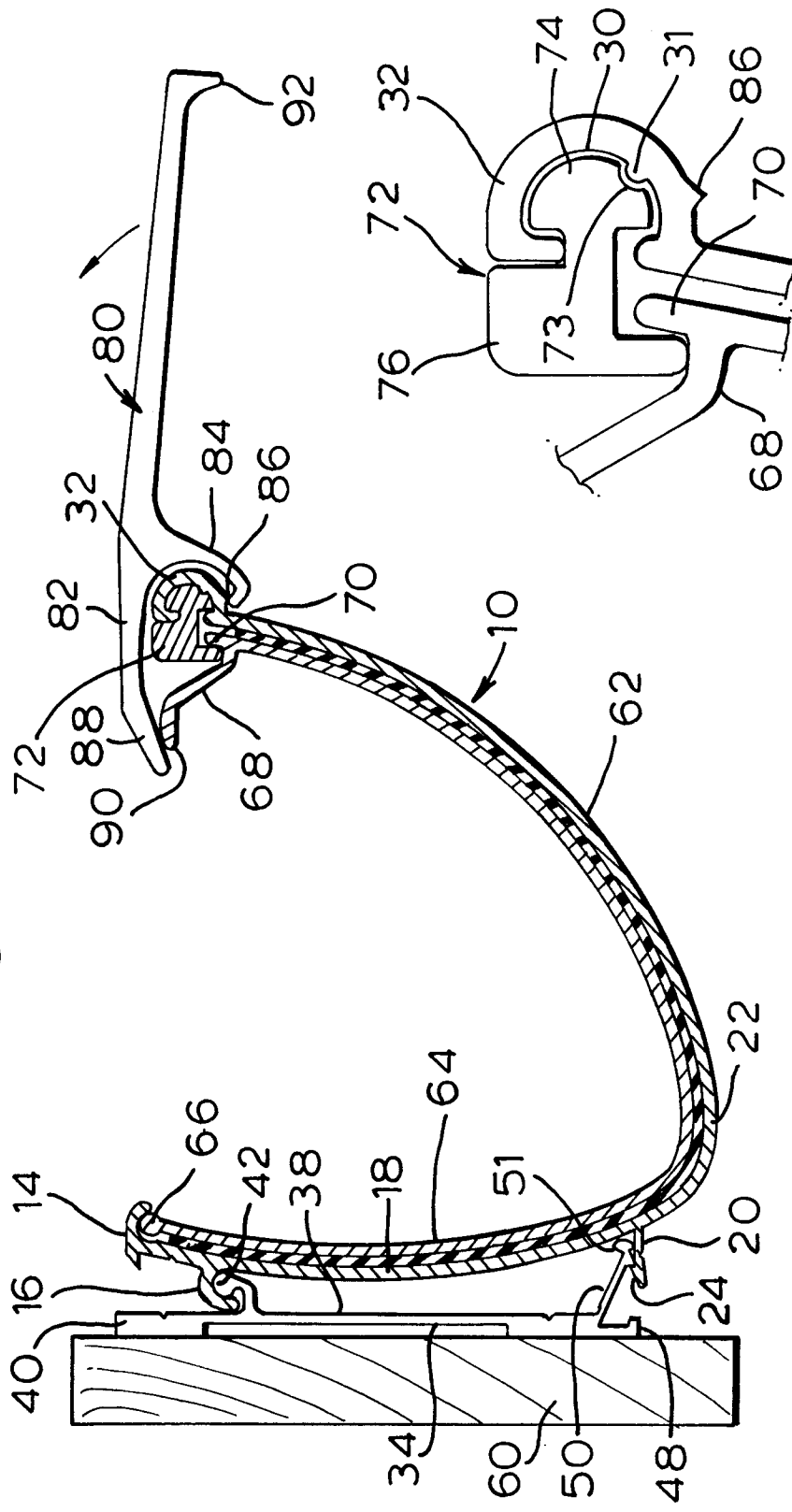


FIG. 9



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EUROPEAN SEARCH REPORT

Application Number

EP 92 30 3423

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X Y	AU-B-6 841 273 (G. A. PEACOCK) * page 3, line 1 - page 4, line 12; figures 1,5 * ---	1 2-7	E04D13/06
Y A	FR-A-2 526 836 (J. ROUSSELLE) * page 3, line 7 - line 35; figures * * ---	2-7 1	
E,X	EP-A-0 481 819 (B A ALUMINIUM LTD) * column 1, line 47 - column 3, line 24; figure * ---	1-3,6-8	
Y	DE-A-2 346 518 (BRAAS & CO) * page 8, line 13 - line 22; figures 5,6 * * ---	8-10	
Y	CA-A-1 225 813 (PLASTMO LTD) * page 5, line 4 - page 6, line 25; figures 2,3,4 * -----	8-10	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E04D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13 AUGUST 1992	Examiner RIGHETTI R.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			