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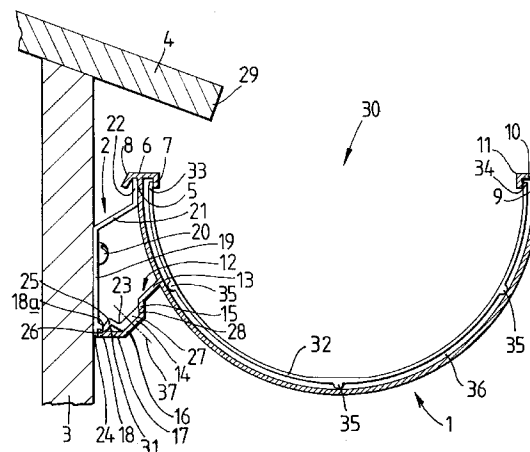
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(54) **Guttering.**

(57) Roof guttering comprising in combination a gutter body and a connector to be secured to a building adjacent its roof in which the connector has first and second spaced apart arms to project outwardly of the building characterised in that the body is formed at one side thereof with spaced apart, first and second formations accessible externally of the body to cooperate with the respective first and second arms so that after the connector is secured to the building the first formation may be engaged with the first arm and the body rotated to engage the second formation with the second arm as a snap fit to lock the body and the connector together.



This invention relates to guttering for the roofs of buildings.

There have been many proposals to provide guttering in which a series of spaced apart brackets is secured to a building adjacent its roof and a gutter body is engaged with the brackets by a clipping action sometimes with the addition of a positive fastening device.

In Australian specification 41273/68 an arrangement is shown for rolled sheet gutters. This includes fairly complex shapes for the brackets and necessitates re-entrant or other gutter formations which prevent the gutter having a smooth, unrelieved, interior of simple cross sectional shape. Furthermore although the arrangement provides for clipping the gutter body to the brackets the eventual engagement of the gutter with its brackets does not hold them tightly together and would permit limited movement between them. Furthermore it is made clear that the gutter may be unclipped from its brackets by a reversal of the assembly movement.

WO 84/02552 and GB 2145754A both show clipped arrangements involving both side walls of the gutter and requiring part of each bracket to extend across the upper, open, part of the gutter. Again, in both cases it is clearly intended that the gutter may be unclipped by reversing the assembly movement.

According to one aspect of the present invention there is provided roof guttering comprising in combination a gutter body and a connector to be secured to a building adjacent its roof in which the connector has first and second spaced apart arms to project outwardly of the building characterised in that the body is formed at one side thereof with spaced apart, first and second formations accessible externally of the body to cooperate with the respective first and second arms so that after the connector is secured to the building the first formation may be engaged with the first arm and the body rotated to engage the second formation with the second arm as a snap fit to lock the body and the connector together.

One embodiment of the invention will now be described by way of example with reference to the single figure of the accompanying drawing which shows, partly in transverse section a gutter secured to a building.

Referring to the drawing a gutter body 1 is carried by a series of connectors 2 secured to a building fascia 3 below its roof 4.

The body 1 is extruded from an aluminium alloy to be slightly more than semi-circular in section. Its inner end 5 is formed with a cap 6 having an inwardly hooked part 7 and an outwardly hooked part 8. The outer end 9 of the body is formed with a cap 10 having an inwardly hooked part 11 corresponding to the part 7. Spaced below the inner end 5, and on the inner side of the body an arm 12 extends outwardly of the body 1 continuously therealong.

This arm has an inner part 13 connected with a flat base 14 by an inclined part 15. The outer end 16 of the base is connected to a tongue 17 inclined oppositely to the part 14. The tongue terminates in a nib 18 having an inclined face 18a. Thus a recess is formed above the base 14 between the part 15 and the tongue 17.

The connector 2 is also extruded from an aluminium alloy which is then cut into short lengths so that a plurality of such connectors can be secured at intervals along the fascia 3. The connector has a base 19 formed with at least one slot to be secured against the fascia by a fastener 20. At its upper end the connector is formed with a first arm 21 terminating in an upward extension 22. The connector has a second arm 23 spaced from its lower end 24. This second arm has an inner zig-zag portion 25 providing a recess 26 and an outer flat portion 27 having a chamfered end 28.

The fascia 3 and roof 4 are indicated diagrammatically and when the gutter body 1 is mounted as described the outer end 29 of the roof extends partially across its open end 30.

In practice a series of connectors 2 is secured to the fascia 3 at intervals of say, 1m and a length of gutter body (which may be 5m) has its hooked part 8 engaged over the extensions 22 of the connectors. The body is then pivoted about the extensions 22 until the nib 18 passes the flat portions 27 with a small clearance and engages shoulders 31 of the zig-zag portions 25. Further pivoting under increased pressure causes the nib 18 to ride up these shoulders and snap into the recesses 26. This arrangement provides a very firm fixing and it will be noted that, when assembled the flat portion 27 closely engages within the recess above the base 14.

When the gutter assembly is in place screws (not shown) could extend on the line 37 to secure the arm 12 to some or all of the connectors 2.

With the arrangement described and shown in the drawing it has been found that the force required to unclip the body by reversal of the assembly movement is much greater than the assembly force. Thus the body 1 can, in practice, be removed from the connectors 2 only by longitudinal sliding. This subordinate feature of the invention can be important when the guttering is of expensive alloy and is used at a location where it might be stolen.

This particularly firm fixing is achieved by virtue of the close engagement of the inclined face 18a within the recess 26. It will be understood that the corresponding surface of the recess 26 closely engages the face 18a and is disposed at such an angle to the base 19 that unclipping the body 1, by rotating it about the upper part of the upward extension 22, requires much greater force than the original assembly movement. While such unclipping is not impossible it means that, for practical purposes, the body 1 can be removed from the connections only by sliding.

In a modification, not shown in the drawing, the zig-zag portion 25 is omitted and the arm 12 lies closely along the tongue 17.

At a juncture of two bodies 2 a bridge 32 is provided. This bridge is also extruded from an aluminium alloy to the same shape as the body 1 but of sufficiently smaller size both to fit within the body and also so that in a relaxed position (not shown) its ends 33 and 34 are curved slightly towards one another. This arrangement enables one end, say 33, to be engaged under the hooked part 7 with the other end 34 outside the hooked part 11. The bridge 32 may then be flexed until its end 34 snaps beneath the hooked part 11 to hold the bridge firmly in place. The bridge has three longitudinal ribs 35 on its outer surface to engage the inner surfaces of adjoining bodies 1 and it is expected that a sealant mastic (not shown) will fill the space 36 between the bodies and the bridge 32. The ribs 35 ensure that the thickness of the body of mastic will be substantially even.

Although as described the body 1 is substantially semi-circular, other shapes could be provided. Also other metals or plastics could be used for the various parts of the gutter assembly.

In the arrangement described above the arm 12 provides substantially all the flexing required to achieve a snap-fit between the body 1 and the connector 2. Other constructions (not shown) are envisaged in which, for example, a locking formation is provided on the body 1 and the arm 23 is appropriately shaped and flexes to engage it.

With some snap-fit arrangements it would be possible to roll form the gutter body 1.

With the described arrangement the continuous arm 12 provides a pleasing appearance from below and also prevents access to the fastening 20 for the connectors 2.

It will be understood that the slot formed in the base 19 of the connector 2 for the fastener 20 enables some adjustment to be made so that a number of connectors can be accurately aligned on the fascia 3. Packing pieces may be used beneath selected connectors to allow for irregularities in the fascia surface. Alternatively the base 19 could be in two parts (not shown) in a manner well known, for example, for other mounting brackets to provide adjustment both in the plane of the fascia and normal thereto.

In addition the snap-fit arrangement could include various positions of engagement. In the described construction this could be achieved by providing a plurality of recesses 26 along the second arm 23 so that the nib 18 can engage any one of them. Such an arrangement would provide additional flexibility in fixing the gutter 1 in circumstances in which it is difficult accurately to align the connectors.

Thus the present invention provides guttering that can include some or all of the following features.

1. All parts of the guttering can be extruded from

light metal alloy.

2. The appearance of the guttering from below is aesthetically pleasing.

3. The interior of the gutter body is unencumbered by fixing devices and presents a smooth profile so that clogging by leaves or other debris is minimised.

4. There is freedom to have the gutter body of different cross sectional shapes.

5. The snap-fit between the body and connectors is particularly firm and can be designed so that unclipping by reverse movement is difficult and, in practice, the body needs to be removed from the connectors by sliding action.

## Claims

1. Roof guttering comprising in combination a gutter body and a connector to be secured to a building adjacent its roof in which the connector has first and second spaced apart arms to project outwardly of the building characterised in that the body is formed at one side thereof with spaced apart, first and second formations accessible externally of the body to cooperate with the respective first and second arms so that after the connector is secured to the building the first formation may be engaged with the first arm and the body rotated to engage the second formation with the second arm as a snap fit to lock the body and the connector together.
2. Guttering according to claim 1 in which the inner end of the gutter body is formed with an outwardly hooked part constituting the first formation and an arm constituting the second formation extends outwardly of the gutter body at a position spaced from the first formation.
3. Guttering according to claim 1 or claim 2 in which the second arm has a part to engage a co-operating part on the second formation in such a manner that the force required to engage the parts as a snap fit is significantly less than that required to release the parts on reversal of the engagement motion.
4. Guttering according to any one of the preceding claims in which both the inner and outer ends of the gutter body are formed with inwardly hooked parts and a bridge is provided to join together two adjacent gutter bodies by engagement with said inwardly hooked parts of both bodies.
5. Guttering according to claim 4 in which the bridge has the same cross-sectional shape as the bodies but is of sufficiently smaller size to fit within

the bodies and in its relaxed state the inner and outer ends of the bridge are curved towards one another so that engagement with the hooked parts will distort the bridge.

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6. Guttering according to any one of the preceding claims in which the gutter body and the connectors are extruded from an aluminium alloy, the connector extrusions being cut to form individual connectors.

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7. Guttering according to any one of the preceding claims in which various positions of snap fit engagement are provided between the gutter bodies and the connectors to provide flexibility in the alignment of the connectors.

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8. Roof guttering substantially as herein described with reference to the single figure of the accompanying drawing.

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