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(12) # EUROPEAN PATENT APPLICATION

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(54) **Improvements in structural members.**

(57) A channel-section structural member 1 for use as the bottom plate of a galvanised steel building frame comprises a central web 2 and two parallel flanges 8 and 10 extending along opposite edges of the web 2 to form a channel. Two ribs 4 and 6 are provided in the web 2 for supporting the ends of upright structural members within the channel in such a manner as to allow a gap for drainage of moisture along the channel. Drainage holes 12 are provided in the structural member 1 so as to enable moisture to drain out of the channel at points intermediate the two ends of the structural member 1, thereby minimising the risk of accumulated moisture resulting in corrosion of the structural member over a period of time.

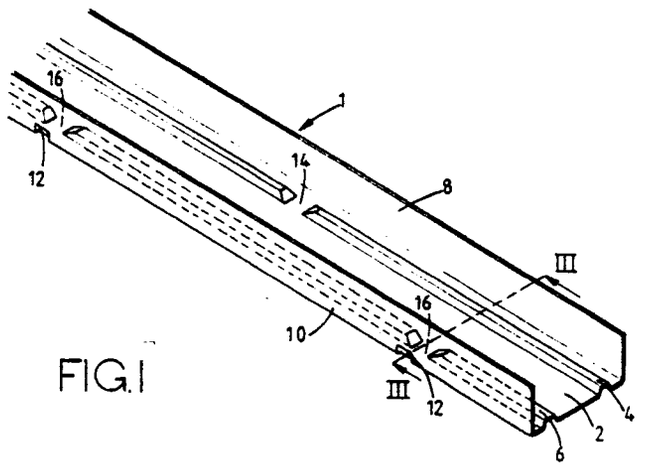

FIG.1

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"Improvements in Structural Members"

This invention relates to structural members, and is more particularly, but not exclusively, concerned with structural members of galvanised steel frames for buildings.

Increasing interest is being shown in the use of zinc-coated (galvanised) steel framing for home building. Once the steel frame has been erected on a sub-floor, it may be lined internally and externally with suitable materials, with thermal insulation being interposed between these linings as desired, and the required external claddings, such as brickwork and/or timber boarding, may be constructed around the frame. Such a method of construction possesses a number of advantages over traditional methods of home construction in terms of strength, stability and reduction of overall building time.

U.K. Specification No. 2,146,054A describes a steel frame for this purpose which incorporates a channel-section bottom member having two ribs formed in the bottom of the channel and extending parallel to the sides of the channel. These ribs serve to support upright members having their ends extending into the channel in such a manner that there is a gap between the end of the upright member and the bottom of the channel which allows moisture accumulating within the channel to drain freely along the length of the channel.

It is an object of the invention to improve the draining properties of such a structural member so as to minimise the risk of accumulated moisture resulting in corrosion of the member over a period of time.

According to the invention there is provided an elongate structural member of channel section having a central web and two parallel flanges extending along opposite edges of the web and projecting to one side of the web, at least one rib being provided in the central web and projecting into the channel formed by the member, wherein at least one drainage hole is provided in the member so as to enable drainage of moisture accumulating within the channel at a point intermediate the two ends of the member.

Such an arrangement provides a significant improvement in terms of resistance to corrosion over the long term since it enables moisture to drain off not only from the ends of the member, but also from one or more points intermediate the two ends.

In a preferred embodiment of the invention drainage holes are provided at equally spaced locations along the length of the member. The drainage holes may be provided in at least one of the flanges. If provided in both flanges, the holes may alternate between the two flanges along the length of the member. Furthermore each hole may be formed so as to extend both through a flange and through the adjacent portion of the central web.

In a development of the invention the or each rib extends longitudinally of the member, and at least one discontinuity is formed in the rib(s) at a point intermediate the two ends of the member so as to enable drainage of moisture at this point between the portions of the web on opposite sides of the discontinuity. The discontinuity preferably comprises simply a portion of the web which is flush with the portions of the web on the two sides of the discontinuity.

In a preferred embodiment discontinuities are provided in the or each rib at equally spaced locations along the length of the member. If two ribs are provided in the central web extending longitudinally of the member, the discontinuities in the two ribs may be staggered in relation to one another along the length of the member.

The invention also provides a method of forming such a structural member utilising separate rolling and punching operations, and preferably also a pressing operation.

The invention also provides a method of forming such a structural member comprising a casting operation.

In order that the invention may be more fully understood, reference will now be made, by way of example, to the accompanying drawing, in which:

Figure 1 is a perspective view of an end portion of a structural member in accordance with the invention;

Figure 2 is a side view of an intermediate portion of the member; and

Figure 3 is a sectional view of the member taken along the line III-III in Figure 1.

The structural member which will now be described with reference to the drawing is intended to be used in a building frame as particularly described in U.K. Specification No. 2,146,054A.

Referring to the drawing, the channel-section structural member 1 comprises a central web 2 having parallel ribs 4 and 6 extending along its length and two parallel flanges 8 and 10 extending along opposite edges of the web 2 and projecting in the same direction as the ribs 4 and 6.

Drainage holes 12 are formed in the flange 10 at 300mm spaced centres along the length of the member 1. These holes 12 overlap the bottom of the flange 10 and extend into the edge of the web 2. No drainage holes are provided in the flange 8.

Furthermore discontinuities 14 are provided in the rib 4 at 300mm spaced centres along the length of the member 1, and discontinuities 16 are provided in the rib 6 at 300mm spaced centres along the length of the member 1. The discontinuities 16 in the rib 6 correspond in position to the drainage holes 12 along the length of the member 1, whereas the discontinuities 14 in the rib 4 are staggered in relation to the discontinuities 16 in the rib 6,being offset by 150mm longitudinally in relation to the discontinuities 16 and the drainage holes 12.

The drainage holes 12 and the discontinuities 14 and 16 in combination enable free drainage of moisture accumulating in the channel at points intermediate the two ends of the member 1, in addition to the drainage at the two ends of the channel.

The above-described structural member is intended primarily for use as the bottom plate of a frame, although it may also be used for studs, noggins, top plates and bracing plates of wall panels, as well as for struts, ties and bracing plates of roof trusses. Generally the member will have longer flanges when used for the bottom chord of a roof truss.

The member 1 may be formed by two possible methods, namely by a pressing method and by a roll-forming method.

In the pressing method, a blank in the form of a flat sheet of a predetermined fixed length and an overall width of 150 mm, for example, is placed in a press brake machine with a maximum tool length of 3658 mm, for example, and the two ribs are pressed in separate operations. After rib pressing, hole punching to a predetermined pattern is carried out. Two right-angled holes are then produced to form the required channel section, and finally the section formed is passed through another tool which produces the flattened discontinuities at predetermined centres one rib at a time.

In the alternative roll forming method, a narrow coil of galvanised steel (for example about 140 mm in width) is fed through a roll former which performs the various operations to produce the final section. If required hole punching can be performed prior to use of the roll former. Furthermore the ribs may be formed either continuously followed by a further operation to form the flattened discontinuities in the ribs, or intermittently with the discontinuities being left between adjacent rib portions. The section is then passed through a series of stages which gradually form the sides of the channel. Finally the fully formed section is cut to a predetermined length.

Whichever of the above methods is used to form the member 1, a protective coating is preferably applied to the member after forming, either by brushing or by spray application. The coating is preferably a cold applied bitumen heavy duty coating which is applied in the form of a thixotropic paint.

Claims

1. An elongate structural member of channel section having a central web (2) and two parallel flanges (8, 10) extending along opposite edges of the web (2) and projecting to one side of the web (2), at least one rib (4, 6) being provided in the central web (2) and projecting into the channel formed by the member, characterised in that at least one drainage hole (12) is provided in the member so as to enable drainage of moisture accumulating within the channel at a point intermediate the two ends of the member.

2. An elongate structural member according to claim 1, characterised in that drainage holes (12) are provided at equally spaced locations along the length of the member.

3. An elongate structural member according to claim 1 or 2, characterised in that the or each drainage hole (12) is provided in one of the flanges (8, 10).

4. An elongate structural member according to claim 3, characterised in that drainage holes (12) are provided in both flanges (8, 10), the holes (12) alternating between the two flanges (8, 10) along the length of the member.

5. An elongate structural member according to claim 3 or 4, characterised in that the or each drainage hole (12) is formed so as to extend both through a flange (8, 10) and through the adjacent portion of the central web (2).

6. An elongate structural member according to any preceding claim, characterised in that each rib (4, 6) extends longitudinally of the member, and at least one discontinuity (14) is formed in the or each rib (4, 6) at a point intermediate the two ends of the member so as to enable drainage of moisture at this point between the portions of the web on opposite sides of the discontinuity (14).

7. An elongate structural member according to claim 6, characterised in that discontinuities (14) are provided in the or each rib (4, 6) at equally spaced locations along the length of the member.

8. An elongate structural member according to claim 6 or 7, characterised in that two ribs (4, 6) are provided in the central web (2) extending longitudinally of the member, and discontinuities (14)

are provided in the two ribs (4, 6) in staggered relation to one another along the length of the member.

9. A method of forming an elongate structural member according to any preceding claim, which method is characterised by the fact that the structural member is formed utilising separate rolling and punching operations, and preferably also a pressing operation.

10. A method of forming an elongate structural member according to any one of claims 1 to 8, which method is characterised by the fact that the structual member is formed utilising a casting operation.

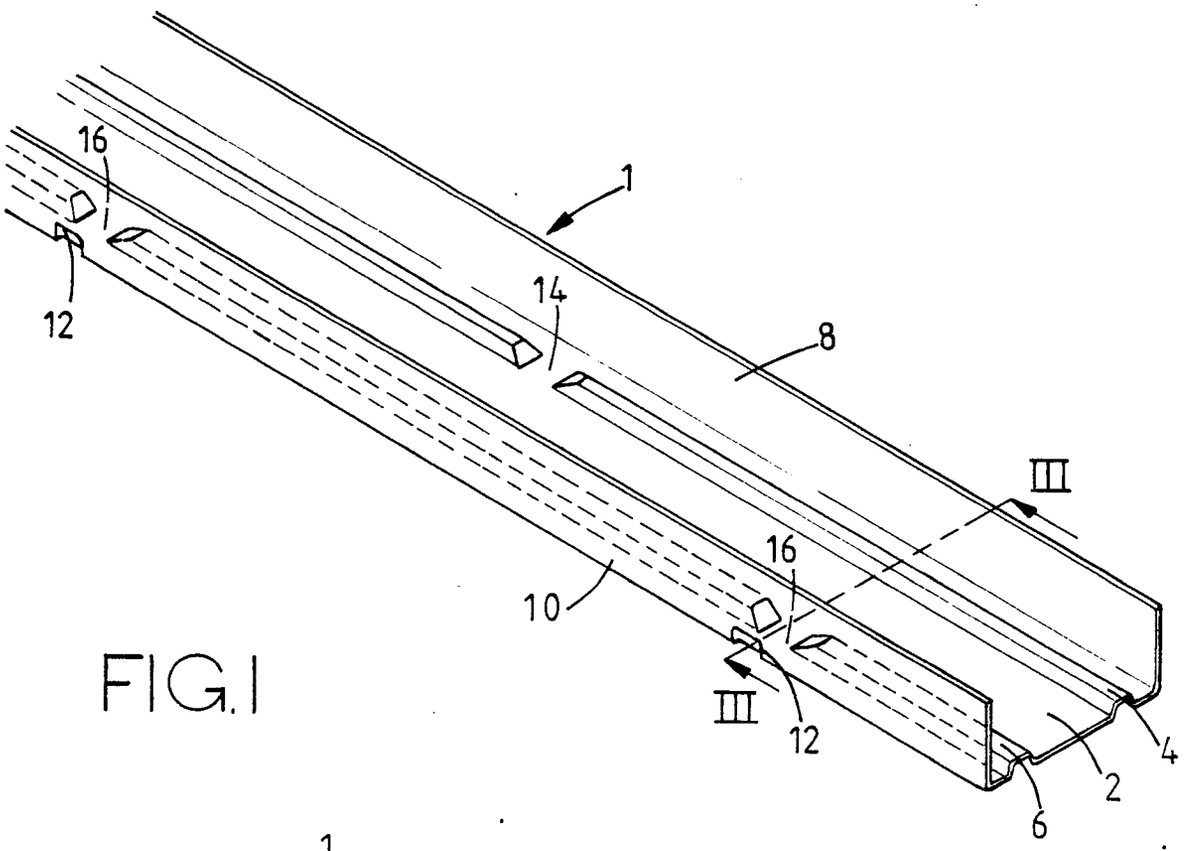

FIG.1

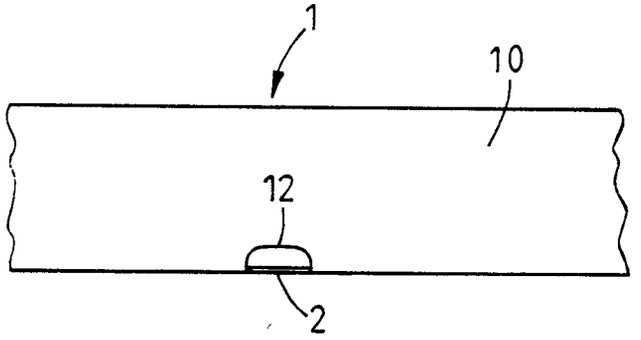

FIG.2.

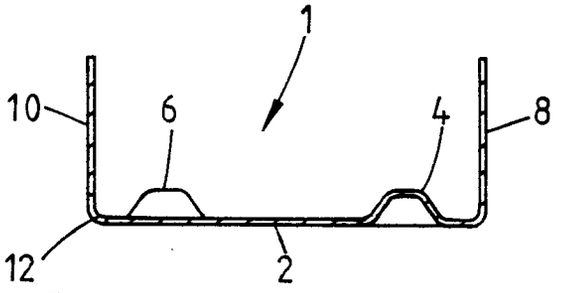

FIG.3.