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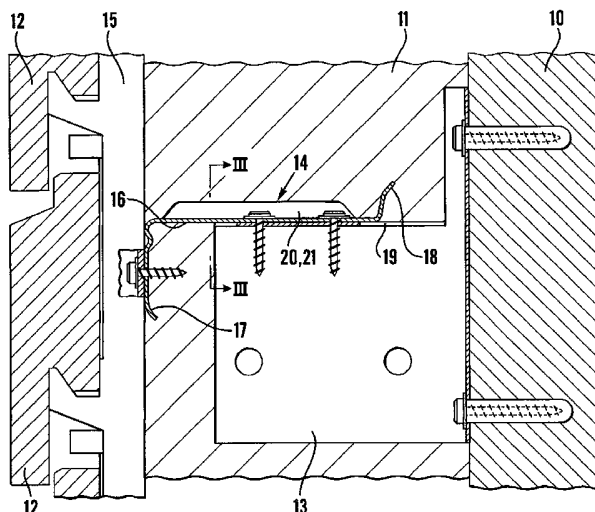
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(54) Title: PROFILED SPACER PROFILE OF THIN SHEET METAL FOR SUPPORTING WALL CLADDING



(57) Abstract: A spacer bar (14) of thin sheet metal adapted to be mounted on a building wall structure (10) to support a wall cladding comprises a generally flat web (16), an outer flange (17) for attachment of cladding support members (15) to the spacer bar (14), the outer flange extending along one of the longitudinal borders of the web and projecting from the web substantially perpendicularly to the plane of the web, and stiffening elements (20, 21) which extend transversely of the spacer bar (14) and are spaced apart along the length of the spacer bar, the stiffening elements being formed by portions cut out of the web and bent to include an angle with the plane of the web. The web (16) is provided with slits extending transversely of the spacer bar (14) across the major portion of the width of the web, and the web portions adjoining the slit on both sides thereof are bent out of the plane of the web to form the stiffening elements (20, 21).



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Profiled spacer profile of thin sheet metal for supporting wall cladding.

This invention relates to a profiled spacer bar of thin sheet metal and, more particularly, to a spacer bar adapted to be mounted on a building wall structure to support a wall cladding.

A prior art profiled spacer bar of the kind with which the invention is concerned comprises a generally flat web, an outer flange for attachment of cladding support members to the spacer bar, the outer flange extending along one of the longitudinal borders of the web and projecting from the web substantially perpendicularly to the plane of the web, and stiffening elements which extend transversely of the spacer bar and are spaced apart along the length of the spacer bar, the stiffening elements being formed by portions cut out of the web and bent to include an angle with the plane of the web (Swedish Design Registration No. 58462).

Spacer bars of this prior art kind are mounted horizontally on a building wall structure to provide a space between, on the one hand, the building wall structure and, on the other hand, vertical bars which are secured to the outer flanges of the spacer bars and form supporting members adapted to support wall cladding bodies (tiles). A layer of insulating material is normally inserted in the space bridged by the spacer bars.

To have the required carrying capability without having to be made from thick sheet metal, the prior art spacer bar is provided with the transversely extending stiffening elements. The cut-out portions forming the stiffening elements are triangular and extend inwardly substantially all the way across the width of the web. They are bent to be substantially perpendicular to the web and increase gradually in height from a point close to the outer flange to an inner flange which is used for the mounting of the spacer bar on the building wall structure.

The inner flange extends along the other longitudinal border of the web and projects from the web in the same direction as the stiffening tabs so that the spacer bar has a Z-like profile.

If the building wall structure on which the prior art spacer bar is to be secured is substantially even, the spacer bar is attached directly to the building wall structure with the inner flange and the cut-out portions forming the stiffening elements directed downwards. When the spacer bar is subjected to the load applied to the support bars by the cladding bodies - these are usually made of a stone material and thus heavy - the stiffening elements serve not only to stiffen the web, but also to support it against the inner flange.

If, on the other hand, the building wall structure is uneven, the spacer bar is not mounted directly on the building wall structure, but on short brackets which are secured to the building wall structure. In that case, the spacer bar is mounted upside down with the inner flange directed upwards and the outer flange directed downwards. It is secured to the upper side of the brackets and spaced apart from the building wall structure by a smaller or larger distance such that all spacer bars will be in the same vertical plane with their outer flanges spaced outwardly from the outer ends of the brackets. The brackets are of the same size and the webs of the spacer bars accordingly will overhang the brackets by larger or smaller distances. Since the stiffening elements are not secured to the inner flange and thus cannot transmit any force to it in the upside down position, they essentially only serve to stiffen the web against bending down of the web portion that overhangs the brackets.

In the prior art spacer bar, a disadvantage that shows itself when the spacer bar is used together with brackets as described is that the stiffening elements, and therefore also the inner flange, are quite high to possess the required stiffening capability. In such cases, the inner flange will be positioned at a distance from the building wall structure and project a substantial distance into the space in which the insulation is to be accommodated. The inner flange, and to some extent also the stiffening elements, make a complete filling of the space above the spacer bar with insulating material more difficult.

An object of the invention is to provide an improved spacer bar of the kind indicated initially, especially for use together with brackets in the manner described.

This object is achieved with a spacer bar of the kind indicated having the structural features set out in the characterising part of claim 1.

5 In the spacer bar according to the invention the stiffening elements are formed by making transverse slits in the web of the spacer bar and bending the portions adjoining each slit away from the plane of the web. Accordingly, at each location where a slit has been made there is a pair of stiffening elements which contribute to stiffening the web of the spacer bar so that the web will be sufficiently stiff even though the height of each stiffening element is small.

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Primarily, the spacer bar according to the invention is for use in the case where the building wall structure is uneven. In such use, the inner flange is not needed for the mounting of the spacer bar because the spacer bar is mounted on brackets. The inner flange therefore only serves to increase the stiffness of the spacer bar against sagging between adjacent brackets, and 15 the spacer bar is sufficiently rigid against such sagging without the inner flange that flange can be dispensed with, and in any case it need not be as high as in the prior art spacer bar.

20 Another advantage of the spacer bar according to the invention is that it can readily be made so as to be stackable, so that it will require a minimum of space during storage and shipping. The bent upstanding portions adjacent to the slits which form the stiffening elements can readily be made so as to be slightly inclined toward one another so that each pair of stiffening elements of 25 an underlying spacer bar can protrude into the space between a pair of stiffening elements of an overlying spacer bar. With appropriately shaped stiffening elements, the webs of the overlying and the underlying spacer bar can be brought very close to one another when the spacer bar is stacked with other, identical spacer bars.

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The invention will be described in greater detail with reference to an exemplary embodiment shown in the accompanying drawing.

Fig. 1 is a vertical sectional view of a building wall structure with a heat insulated cladding structure comprising spacer bars constructed in accordance with the invention;

5 Fig. 2 is a plan view of a portion of the spacer bar shown in Fig. 1;

Fig. 3 is a sectional view on line III-III of Fig. 1.

Fig. 1 illustrates a portion of a building wall structure 10 having a heat insulating layer 11 (e.g. of mineral wool) on its exterior side. Outside the insulating layer 11 a wall cladding formed by horizontally elongate cladding bodies 12 of stone material is supported. The cladding bodies 12 are supported by a support structure which comprises brackets 13 of steel sheet secured to the building wall structure 10, horizontal spacer bars 14 which are secured to the brackets 13 and extend along the building wall structure 10, and vertical bars which are secured to the spacer bars 14 and form support members 15 on which the cladding bodies 12 rest. In the drawing only a single bracket 13, a single spacer bar 14 and a single support member 15 are shown.

20 Both the general arrangement of the illustrated wall cladding structure and the individual cladding bodies 12, brackets 13 and support members 15 are known. The cladding bodies 12 and the support members 15 are as shown in SE 469137 B (=WO92/08857) and the brackets are as shown in Swedish Design Registration No. 58461. On the other hand, the spacer bar 14 is novel.

25 The spacer bar 14 is integrally made from steel sheet of light gauge, such as 0.8-1 mm. It comprises a generally flat web 16 which is horizontal in use, a flange, here referred to as the outer flange 17, which connects with one of the longitudinal web borders, namely, the border that is to the left in Fig. 1. The outer flange 17 is directed downwards in use and carries the support members 15 jointly with the outer flanges 17 of the other spacer bars 14. The support members 15 are secured to the outer flanges 17 by means of screws.

35 In the illustrated embodiment the spacer bar 14 also comprises a short flange, here referred to as the inner flange 18, which connects with the opposite or

inner border of the web 16 and projects upwards and slightly backwards or inwards from the web toward the wall structure 10. The web 16 of the spacer bar 14 rests on the top side of a ledge 19 formed by a lip on the bracket 13. It is held to the bracket by screws with the outer flange 17 positioned in front of
5 (to the left in Fig. 1) the bracket 13 and the inner flange 18 spaced forwardly from the building wall structure 10.

The exact position of the spacer bar 14 on the bracket 13, and thus the overhang or width of the portion of the web 16 which protrudes from the foremost
10 edge of the bracket ledge 19, is selected when the spacer bar is attached to the brackets 13 such that the outer flanges 17 of all spacer bars 14, and thus also the supporting members 15 for the cladding bodies 12, will be in a common vertical plane. Thus, the amount of overhang will depend on the differences in distance between this vertical plane and the building wall structure 10 at the
15 points where the brackets 13 are attached.

In order that downward deflection of the overshooting or overhanging portion of the web 16 under the weight of the cladding bodies 12 may be resisted, the web 16 at regular intervals along the length of the spacer bar 14 is provided
20 with paired stiffening elements 20, 21 which extend transversely of the spacer bar across the major portion of the width of the web and, more particularly, almost across the entire width. Preferably, however, the stiffening elements 20, 21 do not extend closer to the front face of the outer flange 17 than a few millimetres, such as 5 – 10 mm. This also applies to the distance between the
25 stiffening elements 20, 21 and the inner flange 18.

Advantageously, the stiffening elements 20, 21 may be formed using cutting and punching tools.

30 The stiffening elements 20, 21 are formed by first making transverse straight cuts through the web – the cutting lines are indicated by dash-dot lines C in Figs. 2 and 3 – and then bending the adjoining web portions on both sides of each cut upwards from the plane of the web 16 to the position shown in Figs. 2 and 3. As is best shown in Fig. 3, the stiffening elements are slightly
35 asymmetrically bent such that one stiffening element, the one designated by

21, is slightly higher than the other stiffening element 20, but the bending may also be symmetrical so that both stiffening elements are of the same height.

5 As is also best shown in Fig. 3, although bending of the stiffening elements 20, 21 to a position at right angles with the plane of the web 16 would provide maximum height of the stiffening elements and thus maximum resistance to downward bending of the overhanging portion of the spacer bar 14, the stiffening elements 20, 21 are not so bent, but only so as to include an acute angle
10 with the web 16 such that they converge upwards. However, bending of the stiffening elements in this way in conjunction with the rounding of the stiffening element pair 20/21 at the ends as shown in Fig. 2 results in an advantage which justifies some sacrificing of the resistance to downward bending.

15 This advantage is that during storage and shipping, spacer bars 14 of identical dimensions can be stacked such that they will lie one on top of the other with each pair of the stiffening elements 20, 21 of each underlying spacer bar protruding into the space between a pair of stiffening elements 20, 21 of the next overlying spacer bar such that the webs 16 of adjacent stacked spacer bars 14
20 will be very closely spaced and possibly even be in face-to-face engagement.

If it is desired to be able to stack the spacer bars 14, the acute angle included between the stiffening elements 20, 21, on the one hand, and the plane of the web 16, on the other hand, should of course be as large as possible within the
25 limits imposed by the requirement for stackability.

If desired, the heat transmission in the transverse direction of the spacer bar 14 can be reduced in a manner known per se by providing the web 16 with a pattern of slots extending lengthways of the web.

Claims

1. A spacer bar (14) of thin sheet metal adapted to be mounted on a building wall structure (10) to support a wall cladding and comprising
5 a generally flat web (16),
an outer flange (17) for attachment of cladding support members (15) to the spacer bar (14), the outer flange extending along one of the longitudinal borders of the web and projecting from the web substantially perpendicularly to the plane of the web, and
10 stiffening elements (20, 21) which extend transversely of the spacer bar (14) and are spaced apart along the length of the spacer bar, the stiffening elements being formed by portions cut out of the web and bent to include an angle with the plane of the web,
characterised in that
15 the web (16) is provided with slits extending transversely of the spacer bar (14) across the major portion of the width of the web, and
the web portions adjoining the slit on both sides thereof are bent out of the plane of the web to form the stiffening elements (20, 21).
- 20 2. A spacer bar as claimed in claim 1, **characterised** in that the stiffening elements (20, 21) include an acute angle with the plane of the web (16) and converge away from the web.
3. A spacer bar as claimed in claim 1 or 2, **characterised** in that the spacer
25 bar (14) is stackable with other, similar spacer bars (14) such that the webs (16) of adjacent stacked spacer bars (14) are substantially parallel and closely spaced and the stiffening elements (20, 21) of each underlying stacked spacer bar (14) protrude into the space between adjacent stiffening elements (20, 21) of the next overlying spacer bar (14).
- 30 4. A spacer bar as claimed in any one of claims 1 to 3, **characterised** by an inner flange (18) which extends along the opposite border of the web (16) and projects from the web (16) in the same direction as the stiffening elements (20, 21), the inner flange (18) preferably being slightly inclined away from the web
35 (16).

5. A spacer bar as claimed in any one of claims 1 to 4, **characterised** in that the outer flange (17) and the stiffening elements (20, 21) project from the web (16) in opposite directions.

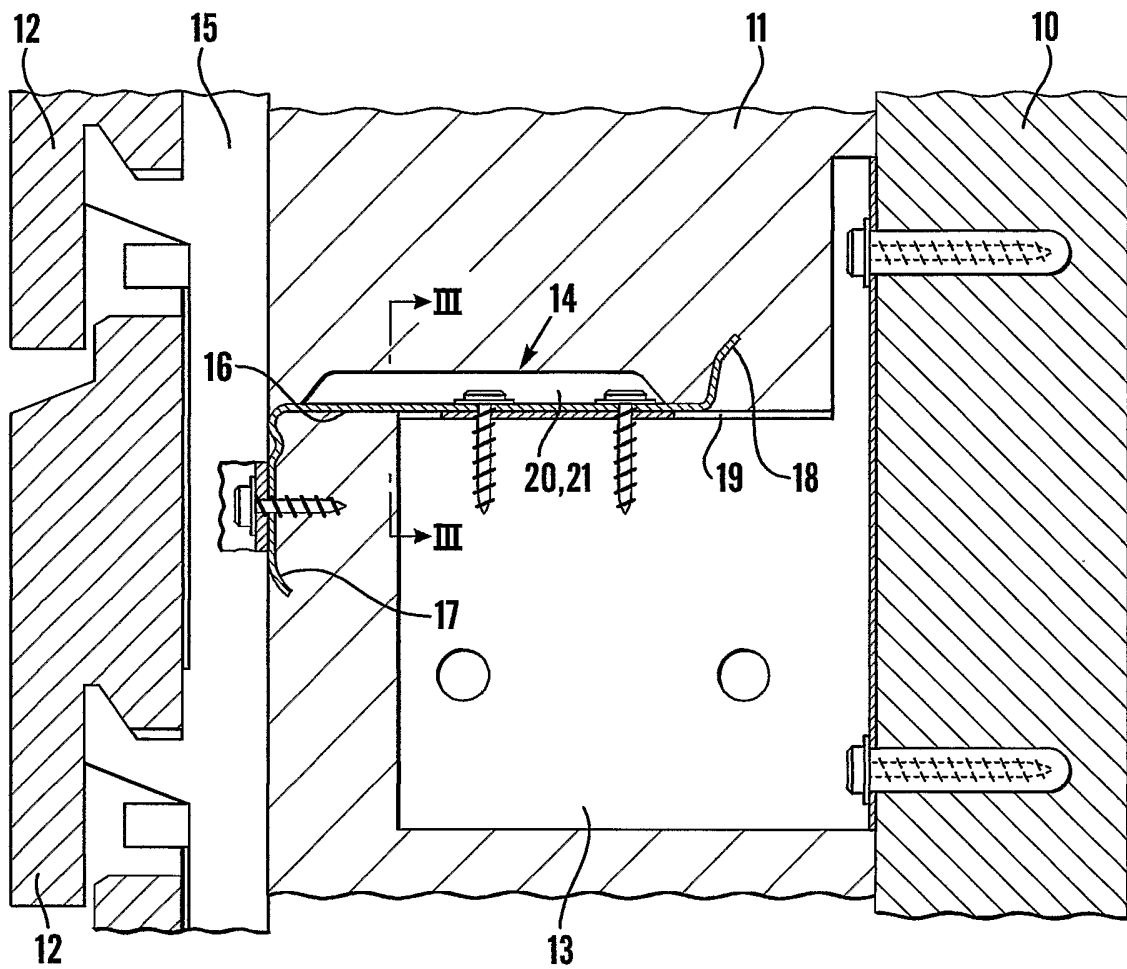


Fig. 1

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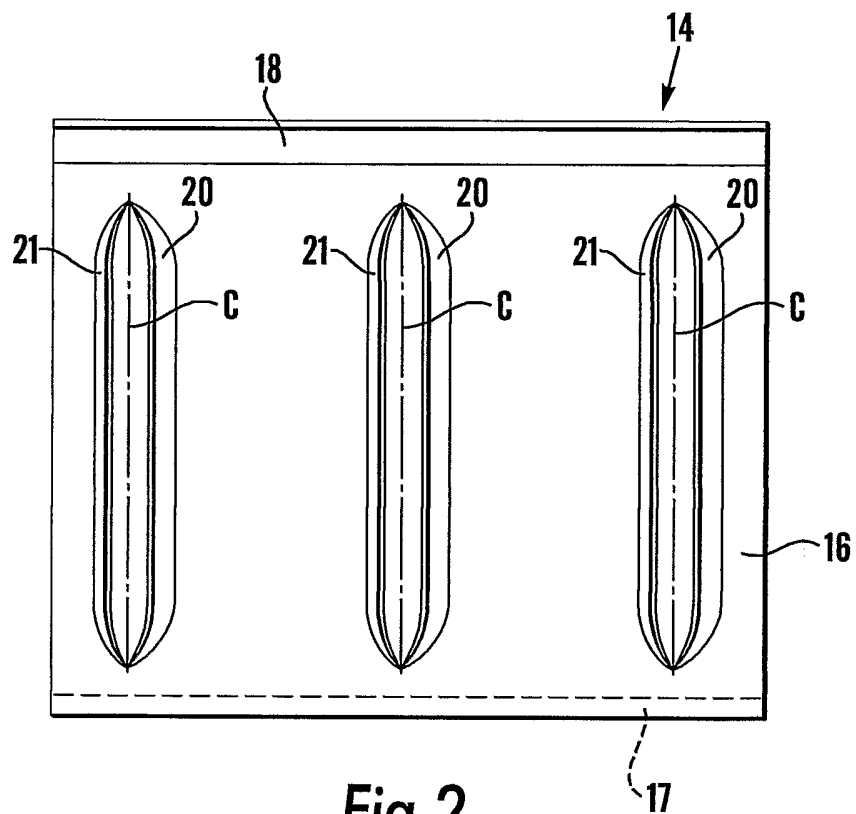


Fig. 2

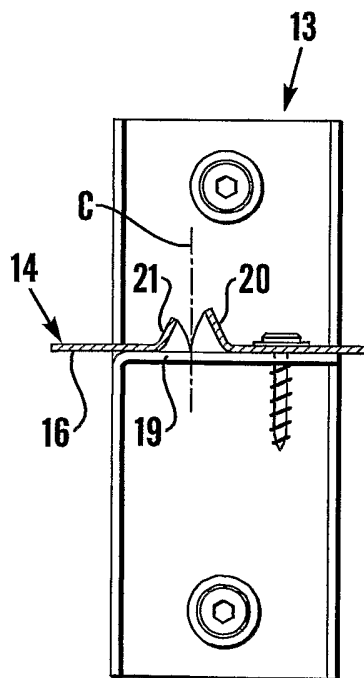


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 03/00895

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: E04B 2/00, E04B 2/96

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: E04B, E04C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 2585391 A1 (BOUYGUES), 30 January 1987 (30.01.87) --	1-5
A	GB 2102469 A (MULTI-DISCIPLINE (DESIGN) ASSOCIATES INC.), 2 February 1983 (02.02.83) --	1-5
A	US 5657593 A (B. ERIKSEN), 19 August 1997 (19.08.97) --	1-5
A	FR 2665469 A1 (QUILLE), 7 February 1992 (07.02.92) -- -----	1-5

 Further documents are listed in the continuation of Box C. See patent family annex.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

29/06/03

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Patent document cited in search report			Publication date	Patent family member(s)	Publication date
FR	2585391	A1	30/01/87	NONE	
GB	2102469	A	02/02/83	NONE	
US	5657593	A	19/08/97	AU 670268 B	11/07/96
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