

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
14 June 2001 (14.06.2001)

PCT

(10) International Publication Number
WO 01/42583 A1

- (51) International Patent Classification⁷: E04C 3/09, B21D 47/02 (74) Agent: PIOVESANA, Paolo; Corso del Popolo, 70, I-30172 Venezia Mestre (IT).
- (21) International Application Number: PCT/EP00/12166 (81) Designated States (*national*): AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (22) International Filing Date: 4 December 2000 (04.12.2000)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: VE99A000047 7 December 1999 (07.12.1999) IT
- (71) Applicant (*for all designated States except US*): DALLAN S.R.L. [IT/IT]; Via Per Salvatronda, 50, I-31033 Castelfranco Veneto (IT).

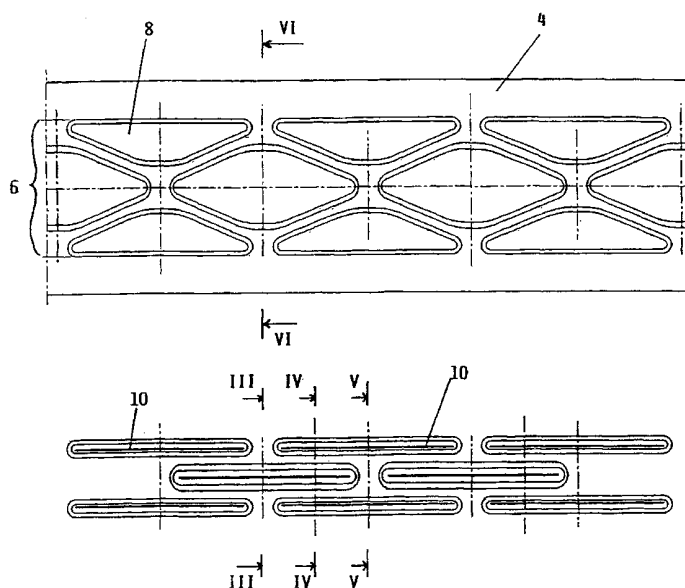
Published:

— With international search report.

- (72) Inventors; and
(75) Inventors/Applicants (*for US only*): DALLAN, Sergio [IT/IT]; Via Per Salvatronda, 50, I-31033 Castelfranco Veneto (IT). DALLAN, Andrea [IT/IT]; Via Per Salvatronda, 50, I-31033 Castelfranco Veneto (IT).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD FOR PRODUCING METAL PROFILE BARS FOR SUPPORT STRUCTURES FOR PANELS, PARTICULARLY OF PLASTER-BOARD, AND PROFILE BAR PRODUCED BY THE METHOD



(57) Abstract: A method for producing C-shaped metal profile bars for support structures for panels, particularly of plaster-board, characterised by subjecting a metal strip of width less than the development of the profile bar to be obtained, to the following operations: incising at least that band of the strip which in the C-shaped profile bar is to form the central web; pressing said band, with bending of the edges of the incisions and dishing of the edge ends to obtain a rim endlessly bounding each incision; profile-forming said strip to obtain the C-shaped profile bar; transversely stretching the pressed portion of the strip.



WO 01/42583 A1

METHOD FOR PRODUCING METAL PROFILE BARS FOR SUPPORT STRUCTURES FOR PANELS, PARTICULARLY OF PLASTER-BOARD, AND PROFILE BAR PRODUCED BY THE METHOD.

This invention relates to a method for producing metal profile bars for support structures for panels, particularly of plaster-board, and a profile bar produced by the method.

Metal structures to which plaster-board panels are applied are known. They generally comprise vertical C-shaped profile bars secured at both their ends within the longitudinal cavity of horizontal profile bars fixed to the floor and ceiling. The plaster-board panels are fixed to one or both of the lateral flanges of these vertical C-shaped profile bars, preferably by self-tapping screws.

A drawback of these known profile bars is that during the fixing of the panels to the vertical C-shaped profile bars, the self-tapping screws tend to bend that flange of the profile bar into which they are being screwed, so making fixing difficult.

To enable cables to pass behind the plaster-board panels and through the vertical profile bars of the support structure, these profile bars, and in particular their central web, are provided with aperture, preferably with a dished edge, and/or with raised stiffening portions. This not only does not reduce material consumption, but requires additional work on the profile bar during or after its manufacture.

Another known profile bar for applying plaster-board panels has a substantially Σ -shaped cross-section, with the two inclined flanges comprising a series of cuts for reducing the thermal conductivity of the profile bar and hence increasing its fire resistance. Moreover, a certain facility for deforming the profile bar at the inclined flanges enables the distance

between the two parallel flanges to be adjusted, hence enabling the same profile bars to be used for forming plaster-board walls of different thicknesses.

Drawbacks of this profile bar are the considerable use of material for
5 its construction and the large number of operations required for its production.

An object of the invention is to produce profile bars for forming plaster-board panel support structures which provide all the facilities offered individually by the different types of known profile bars, while at the same
10 time eliminating all the drawback individually presented by said known profile bars.

This and further objects which will be apparent from the ensuing description are attained, according to the invention, by a method for producing C-shaped metal profile bars for support structures for panels,
15 particularly of plaster-board, as described in claim 1.

The C-shaped profile bar obtained in this manner is characterised in that at least its central web comprises at least one stretched longitudinal band comprising a plurality of apertures with their edge bent and projecting from the plane of the web.

20 A preferred embodiment of the invention is described in detail hereinafter with reference to the accompanying drawings, on which:

Figure 1 is a plan view of a piece of the profile bar of the invention,

Figure 2 shows a portion of strip which has already undergone the pressing stage but has not yet been subjected to the forming and stretching
25 stages,

Figure 3 is a cross-section on the line III-III of Figure 2,

Figure 4 is a cross-section on the line IV-IV of Figure 2,

Figure 5 is a cross-section on the line V-V of Figure 2, and

Figure 6 shows in side view the profile bar.

As can be seen from the figures, the profile bar of the invention is of
5 C-shape, with its lateral flanges 2 flat and its central web 4 having a stretched central longitudinal band 6 comprising a plurality of apertures 8 with their edge bent and projecting from the plane of said web.

To construct this profile bar, according to the invention a metal strip unwound from a reel and if necessary subjected to usual straightening is
10 firstly incised and pressed along the longitudinal band 6, which in the finished profile bar is to form the central web 4.

More specifically, in said band 6 a plurality of longitudinal incisions
10 are made, aligned along parallel rows, the same tool making these incisions also being used to bend the metal along the edges of each incision
15 and to dish the metal along the two edge ends, to obtain a sort of endless rim about each of said incisions 10.

After performing this series of operations, the strip processed in this manner is subjected to profile-forming to transform it into an intermediate C-shaped profile bar with its lateral flanges equal to the width of the flanges of
20 the final C-shaped profile bar to be obtained, and with its central web of width less than the central web of the final C-shaped profile bar to be obtained, the longitudinal bends along this web being made such that the endless rim of the incisions 10 projects towards the interior of the profile bar.

This intermediate C-shaped profile bar is then stretched transversely
25 to open the incision 10 and cause the central web to assume the width of the final profile bar to be obtained. This, by virtue of the rim surrounding each

aperture 8, present a resistance to transverse bending which is equal to or greater than that of an unstretched profile bar, notwithstanding the reduction in transverse bending resistance which stretching inevitably brings.

In the described example the incising and the pressing of the incision edges are effected virtually simultaneously by the same tool (see Figures 3-5) after which initial profile-forming is effected, then stretching, followed by final profile-forming.

However by using different equipment the various operations can be effected in different sequence. For example, profile-forming and stretching can be effected simultaneously, or firstly profile-forming then stretching, or vice versa. Alternatively, at least partial profile-forming can be effected, then incising and pressing, and finally stretching.

Independently of the method followed, the increase in transverse flexure yieldability of the central web 4 due to the stretching is compensated by an increase in the moment of inertia, and hence by an increase in the transverse bending resistance, obtained by pressing.

Because of this, the mechanical characteristics of the profile bar obtained are totally comparable with those of a profile bar of identical dimensions by without the stretched web. At the same time the profile bar of the invention also has considerable further advantages, such as:

- a low heat transfer coefficient from one lateral flange to the other,
- a low sound transfer coefficient from one lateral flange to the other,
- the ability to ventilate the interspace of the wall bounded by the facing palster-board panels, by way of the panel support structure,
- use of a smaller quantity of material than that required for a traditional C-shaped profile bar of equal outer dimensions,

- the ability to vary the width of the central web of the profile bar within certain limits while starting from the same metal strips, by varying the extent of stretching,
- the ability to obtain cable passage aperture in the profile bar without special machining, these apertures being able to be enlarged if necessary by simply operating with a cutter in the regions concerned,
- the ability to obtain these facilities on the profile-forming line itself, and hence without substantial increase in machining times and costs.

The illustrated example relates to a C-shaped profile bar with a single central web stretched and then pressed into spaced-apart rectangular areas or into various undulated patterns. However, stretching and pressing could also be applied to the lateral flanges 2, which in this manner can be lightened and stiffened against transverse flexure, so being suitable for ceiling application of plaster-board panels without suffering deformation of the lateral flanges, which could be a possible cause of uncoupling of the profile bar from the suspension member.

C L A I M S

1. A method for producing C-shaped metal profile bars for support structures for panels, particularly of plaster-board, characterised by subjecting a metal strip of width less than the development of the profile bar
5 to be obtained, to the following operations:
- incising at least that band (6) of the strip which in the C-shaped profile bar is to form the central web (4),
 - pressing said band (6), with bending of the edges of the incisions (10) and dishing of the edge ends to obtain a rim endlessly bounding each incision,
10 - profile-forming said strip to obtain the C-shaped profile bar,
 - transversely stretching the pressed portion of the strip.
2. A method as claimed in claim 1, characterised by effecting the pressing such as to bring the burrs, obtained during the preceding incising stage, onto that side of the strip corresponding to the inner side of the profile
15 bar to be obtained.
3. A method as claimed in claim 1, characterised by effecting the incising and pressing simultaneously.
4. A method as claimed in claim 1, characterised by effecting the profile-forming and stretching simultaneously.
- 20 5. A method as claimed in claim 1, characterised by effecting the profile-forming after the stretching.
6. A method as claimed in claim 1, characterised by effecting the stretching after the profile-forming.
7. A method as claimed in claim 1, characterised in that the profile-
25 forming at least partially precedes the incising and pressing.

8. A method as claimed in one or more of claims 1 to 7, characterised by processing those longitudinal bands of the metal strip which are to form the central web and the two lateral flanges in the C-shaped profile bar.

9. A C-shaped metal profile bar obtainable by the method claimed in one
5 or more of claims 1 to 8, characterised in that at least its central web (4) comprises at least one stretched longitudinal band (8) displaying a plurality of apertures (8) with their edge bent and projecting from the plane of the web.

10. A profile bar as claimed in claim 9, characterised in that only its central
10 web (4) comprises the longitudinal band (6) with the apertures (8).

11. A profile bar as claimed in claim 9, characterised in that its central web (4) and both its lateral flanges comprise the longitudinal band (6) with the apertures (8).

12. A profile bar as claimed in claim 9, characterised in that the edge of
15 the apertures (8) is bent towards the interior of the profile bar.

1/1

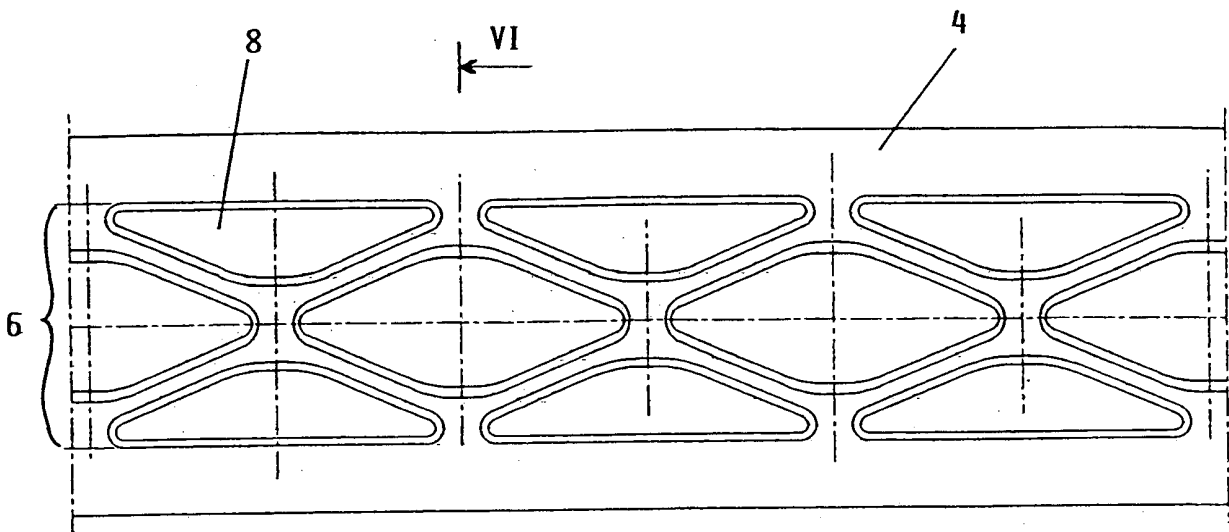


FIG. 1

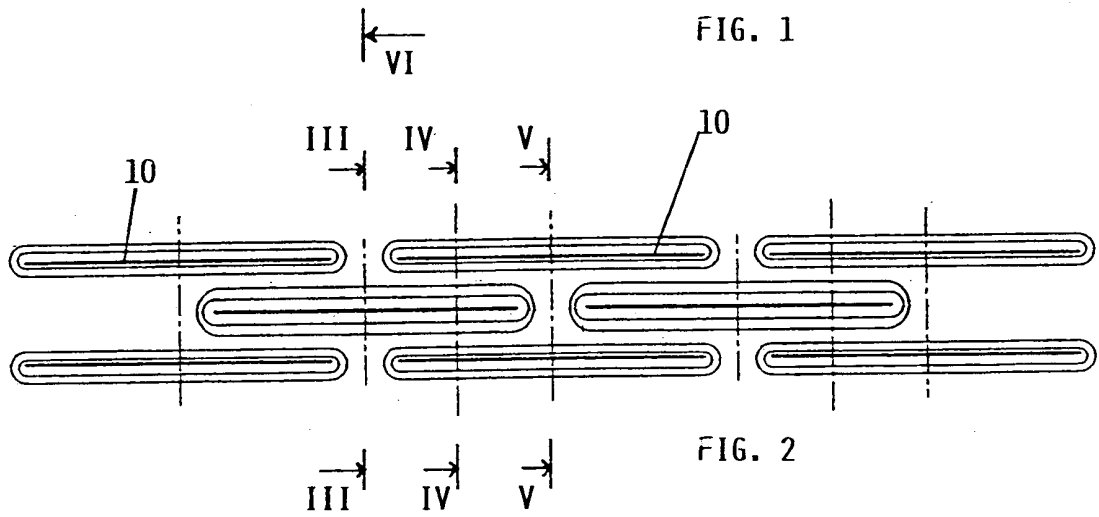


FIG. 2



FIG. 3

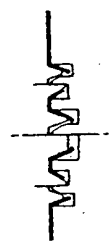


FIG. 4

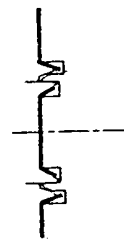


FIG. 5

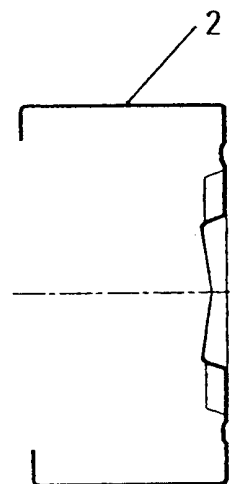


FIG. 6

INTERNATIONAL SEARCH REPORT

national Application No PCT/EP 00/12166

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 E04C3/09 B21D47/02

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)
 IPC 7 E04C B21D

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 298 081 A (TERRELL ET AL.) 17 January 1967 (1967-01-17)	1,2, 6-10,12
Y	column 2, line 45 -column 5, line 28; figures 1-4,9,11	3-5,11
Y	---	
Y	US 3 129 792 A (GWYNNE) 21 April 1964 (1964-04-21)	3
A	column 3, paragraph 2; figures 1,3,8-10	1,2,9, 11,12
Y	---	
Y	US 3 812 558 A (WATANABE) 28 May 1974 (1974-05-28)	4,5
A	abstract; figures 1-6,18,20,24,25	1,8
Y	---	
Y	GB 1 308 560 A (DEWENDEL) 28 February 1973 (1973-02-28)	11
A	page 1, line 45 - line 92; figures 1,7	1,9

	-/--	

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search 16 March 2001	Date of mailing of the international search report 26/03/2001
---	---

Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Righetti, R
--	--

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 00/12166

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 1 937 762 A (KESSLER) 5 December 1933 (1933-12-05) page 2, line 65 - line 89; figures 4,5 -----	1,3,9

INTERNATIONAL SEARCH REPORT

Information on patent family members

i. International Application No PCT/EP 00/12166
--

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
US 3298081	A	17-01-1967	NONE	
US 3129792	A	21-04-1964	NONE	
US 3812558	A	28-05-1974	CA 964941 A DE 2121206 A GB 1352568 A	25-03-1975 11-11-1971 08-05-1974
GB 1308560	A	21-02-1973	FR 2059963 A BE 754548 A CH 530526 A DE 2039155 A LU 61477 A NL 7011631 A SU 364177 A	11-06-1971 18-01-1971 15-11-1972 25-02-1971 21-10-1970 09-02-1971 25-12-1972
US 1937762	A	05-12-1933	NONE	