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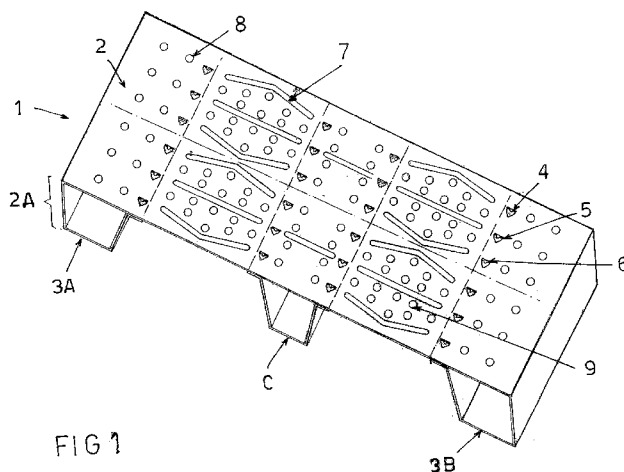
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**Published:**

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(54) **Title:** METAL BOARD FOR SCAFFOLDING AND METHOD OF MANUFACTURING THE SAME



(57) **Abstract:** A metal board (1) for scaffolding comprising a metal base sheet (2), at least one support member (3A, 3B, 3C) and means for connecting (4) said at least one support member (3A, 3B, 3C) to said base sheet (2), characterised in that said connecting means (4) comprise a plurality of tabs (5) extending transversally from said base sheet (2) or respectively from said at least one support (3A, 3B, 3C) member, said tabs (5) projecting through a plurality of apertures (6) in said at least one support member (3A, 3B, 3C) or respectively in said base sheet (2) and further extending along said at least one support member (3A, 3B, 3C) or respectively along said base sheet (2) so as to be able to overlap said at least one support member (3A, 3B, 3C) or respectively said base sheet (2) in a junction zone (11) there between. The invention further comprises a process for manufacturing such a metal board.



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## **METAL BOARD FOR SCAFFOLDING AND METHOD OF MANUFACTURING THE SAME**

The present invention relates to a metal board for scaffolding and a method of manufacturing the same.

Scaffolding metal boards known in the state of the art comprise a metal base sheet and at least one support member. The metal base sheet is usually made of steel, and it is usually connected to the support member by means of welding.

Current scaffolding metal boards have a number of drawbacks.

In particular, connecting the support to the base sheet by welding gives rise to the possibility of corrosion at the junction. Such corrosion can subsequently spread to other parts of the unit and clearly presents a serious safety hazard.

A further drawback of current metal boards is the high energy consumption for the production process including a welding phase.

The technical task proposed by the present invention is therefore that of providing a metal board for scaffolding and a method of manufacturing the same which overcome the noted technical drawbacks of the prior art.

Within the scope of this technical task, one object of the invention is that of providing a metal board for scaffolding with a metal base sheet and at least one support member connected thereto, while minimising the risk of corrosion.

Another object of the invention is that of providing a metal board of simple, robust design for scaffolding.

A last but not least object of the invention is that of providing an energy-efficient method of manufacturing a metal board for scaffolding.

The technical task, as well as these and other objects, are achieved according to the present invention by a metal board for scaffolding, said metal board comprising a metal base sheet, at least one support member and means for connecting said at least one support member to said base sheet, characterised in that said connecting means comprise a plurality of tabs extending transversally from said base sheet or respectively from said at least one support member, said tabs projecting through a plurality of apertures in said at least one support member or respectively in said base sheet and further extending along said at least one support member or respectively along said base sheet so as to be able to overlap said at least one support member or respectively said base sheet in a junction zone there between.

The present invention also relates to a process for manufacturing a metal board for scaffolding, said metal board comprising a metal base sheet, at least one support member and means for connecting said support member to said base sheet, characterised in that it comprises, along a single production line:

- a) a first step of unwinding a roll of said base sheet;
- b) a second step of creating a plurality of apertures, and placing a plurality of cuts, in said unwound base sheet;
- c) a third step of bending said base sheet at said cuts so as to create a plurality of tabs extending transversally there from;

- d) a fourth step of shaping at least one edge of said base sheet so as to form at least one support member, such that said tabs are aligned with and project through said apertures;
- e) a fifth step of bending said tabs such that they extend along said at least one support member or said base sheet so as to overlap said at least one support member or respectively said base sheet in a junction zone there between;
- f) a sixth step of cutting said base sheet into sections of desired length.

The use of connecting means that do not involve welding helps to avoid the risk of corrosion.

The connecting means of the present invention comprise a form of "mechanical stitching" by passing tabs from either the base sheet or the support member through corresponding apertures in the other member, and subsequently folding the tabs such that they overlap this member. The design of the unit and the method of manufacturing it on a single production line provide a simple, robust connection and can be accomplished without the high energy requirements of welding.

Advantageously, the process of manufacturing the metal boards on a single production line prevents lateral displacement and thus ensures perfect alignment of the support member with the base sheet.

As the step of cutting the base sheet into metal boards is the last in the process, this process allows great flexibility of choice of the length of the metal boards.

Other characteristics of the present invention are moreover defined in the subsequent claims. Further characteristics and advantages of the present invention will be more evident from the description of a preferred, but not exclusive embodiment of the metal board for scaffolding and the method for producing the same according to the finding, illustrated in the attached non-limiting drawings, wherein:

Figure 1 shows a schematic perspective view of the metal board in accordance with one embodiment of the invention.

Figure 2 shows a top view of a section of the metal board.

Figure 3 shows a cross-sectional side view of the metal board along line A-A of figure 2.

Figure 4 shows a cross-sectional view of the connecting means along line B-B of figure 2 during processing.

Figure 5 shows a top view of a section of the metal base sheet during processing.

With reference to the above figures, the metal board (1) comprises a metal base sheet (2), at least one support member (3A) (3B) (3C), and connecting means (4) for connecting the at least one support member to the base sheet.

The connecting means (4) comprise a plurality of tabs (5) projecting from either the base sheet (2) or the support member (3A) (3B) (3C), extending through apertures (6) in the support member or the base sheet, respectively, and then extending along – and overlapping – the support member or base sheet, respectively.

Preferably, the tabs (5) are tapered so as to facilitate insertion into the apertures (6).

The support member (3A) (3B) (3C) can optionally be formed integrally with the base sheet (2) by folding an edge (2A) of said base sheet: for instance in the embodiment shown in the above figures, two support members (3A) (3B) are integrally formed with said base sheet (2) and one support member (3C) is individual.

The metal board can optionally also comprise stiffening means. These can be in a variety of forms, preferably in the form of elongated protrusions (7) extending from said base sheet.

Similarly, the metal board can optionally comprise anti-slip means. These can be in a variety of forms, preferably in the form of protrusions (8) extending from said base sheet.

Furthermore, the metal board can comprise liquid drainage means, preferably in the form of secondary apertures (9) in said base sheet. These allow the run-off of liquid from the surface of the unit.

The metal board may optionally also comprise retaining means, preferably in the form of a stacking protrusion (not shown) along the each of the front and rear edges of the base sheet (2) which, when metal boards are stacked, align beneath one another so as to help prevent lateral displacement of the metal boards.

The following is a non-limiting example of the manufacture of the metal board of the present invention.

The metal board (1) for scaffolding is manufactured on a single production line.

This involves a first step of unwinding a roll of metal base sheet (2). In a second step, a plurality of apertures (6) are created and a plurality of cuts (10) are made in the unwound base sheet. Preferably, the cuts (10) are tapered and the apertures (6) are elongated in nature and are at least as wide as the widest section of the tapered cuts. In a third step, the base sheet (2) is bent at said cuts (10) so as to create a plurality of tabs (5) extending transversally therefrom.

In a fourth step, at least one edge (2A) of the base sheet (2) is shaped so as to form at least one support member (3A) (3B), such that the tabs (5) are aligned with, and project through, the apertures (6), as shown in figure 4. The production along a single line prevents lateral displacement and thus ensures that this alignment is very precise. The tapered nature of the tabs (5) resulting from the tapered cuts (10) also facilitate insertion into the apertures (6).

In figure 5, the tabs (5) are located close to the centre of the base sheet (2) and the apertures (6) are shown as being along the edge (2A) of the base sheet and therefore becoming part of the support members (3A) (3B). However, it will be appreciated that the apertures can alternatively be created closer to the centre of the base sheet and the tabs be located along the edge, such that the tabs instead become part of the support members.

In a fifth step, as shown in figure 4, the tabs (5) are then bent such that they extend along the support member (3A) (3B), or respectively the base sheet (2), so as to

overlap this in a junction zone (11) therebetween. This is preferably carried out by use of compression rollers.

In a sixth and final step, the base sheet is cut into sections of desired length. This being the last step helps to prevent lateral displacement of the base sheet during processing and provides flexibility in choosing any desired length of unit.

Optional additional steps in the process include creating a plurality of elongated protrusions (7) in the base sheet (2) for stiffening, creating a plurality of protrusions (8) in the base sheet for anti-slip, creating a plurality of secondary apertures (9) in the base sheet for liquid drainage, and creating a plurality of stacking protrusions in the base sheet for preventing lateral movement of the metal boards when stacked. Preferably, these steps precede step four described above.

The metal board and the method of manufacturing the same thus conceived is susceptible to numerous modifications and variations, all falling within the scope of the inventive concept; furthermore, all details may be substituted by technically equivalent elements. In practice, any material type or size may be used, according to needs and the state of the art.

**CLAIMS**

1. A metal board for scaffolding comprising a metal base sheet, at least one support member and means for connecting said at least one support member to said base sheet, characterised in that said connecting means comprise a plurality of tabs extending transversally from said base sheet or respectively from said at least one support member, said tabs projecting through a plurality of apertures in said at least one support member or respectively in said base sheet and further extending along said at least one support member or respectively along said base sheet so as to be able to overlap said at least one support member or respectively said base sheet in a junction zone there between.
2. A metal board as claimed in claim 1, characterised in that said at least one support member comprises an edge of said base sheet shaped to form said support member.
3. A metal board as claimed in any preceding claim, characterised in that said tabs are tapered.
4. A metal board as claimed in any preceding claim, characterised in that said base sheet comprises stiffening means.
5. A metal board as claimed in claim 4, characterised in that said stiffening means comprise elongated protrusions from said base sheet.
6. A metal board as claimed in any preceding claim, characterised in that said base sheet comprises anti-slip means.
7. A metal board as claimed in claim 6, characterised in that said anti-slip means comprise protrusions from said base sheet.
8. A metal board as claimed in any preceding claim, characterised in that said base sheet comprises means for liquid drainage.
9. A metal board as claimed in claim 8, characterised in that said drainage means comprise secondary apertures in said base sheet.
10. A metal board as claimed in any preceding claim, characterised in that said base sheet comprises retaining means.
11. A metal board as claimed in claim 10, characterised in that said retaining means comprise stacking protrusions in said base sheet.
12. A process for manufacturing a metal board for scaffolding, said metal board comprising a metal base sheet, at least one support member and means for connecting said support member to said base sheet, characterised in that it comprises, along a single production line:
  - a first step of unwinding a roll of said base sheet;
  - a second step of creating a plurality of apertures, and placing a plurality of cuts, in said unwound base sheet;

- a third step of bending said base sheet at said cuts so as to create a plurality of tabs extending transversally there from;
- a fourth step of shaping at least one edge of said base sheet so as to form at least one support member, such that said tabs are aligned with and project through said apertures;
- a fifth step of bending said tabs such that they extend along said at least one support member or said base sheet so as to overlap said at least one support member or respectively said base sheet in a junction zone there between;
- a sixth step of cutting said base sheet into sections of desired length.

13. A process as claimed in claim 12, characterised in that said cuts are tapered.
14. A process as claimed in claims 12 or 13, characterised in that said bending of said tabs is by means of compression rollers.
15. A process as claimed in any of claims 12 to 14, characterised in that it comprises a further step of creating a plurality of elongated protrusions in said base sheet for stiffening.
16. A process as claimed in any of claims 12 to 15, characterised in that it comprises a further step of creating a plurality of protrusions in said base sheet for anti-slip.
17. A process as claimed in any of claims 12 to 16, characterised in that it comprises a further step of creating a plurality of secondary apertures in said base sheet for liquid drainage.
18. A process as claimed in any of claims 12 to 17, characterised in that it comprises a further step of creating a plurality of stacking protrusions in said base sheet for retaining.

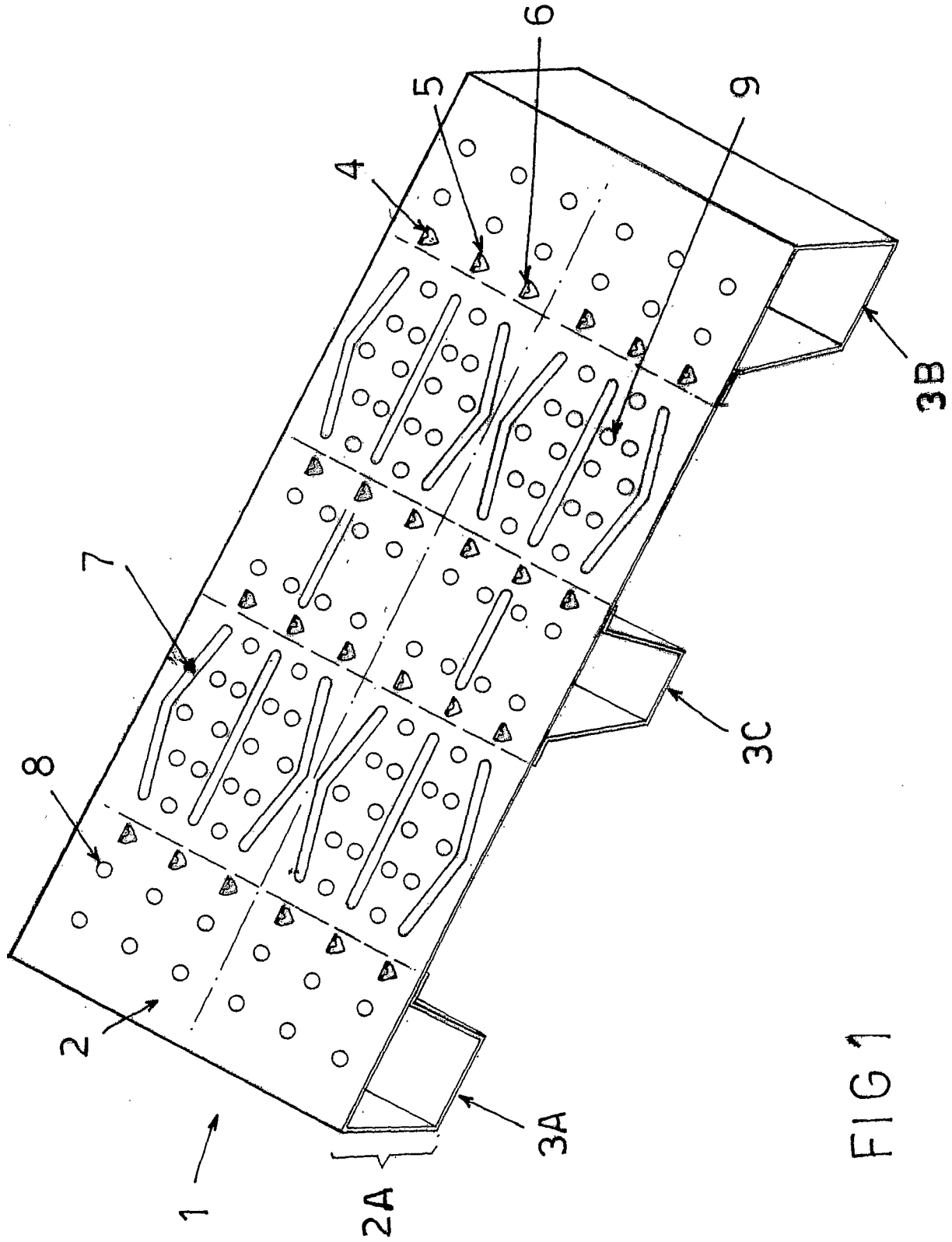


FIG 1

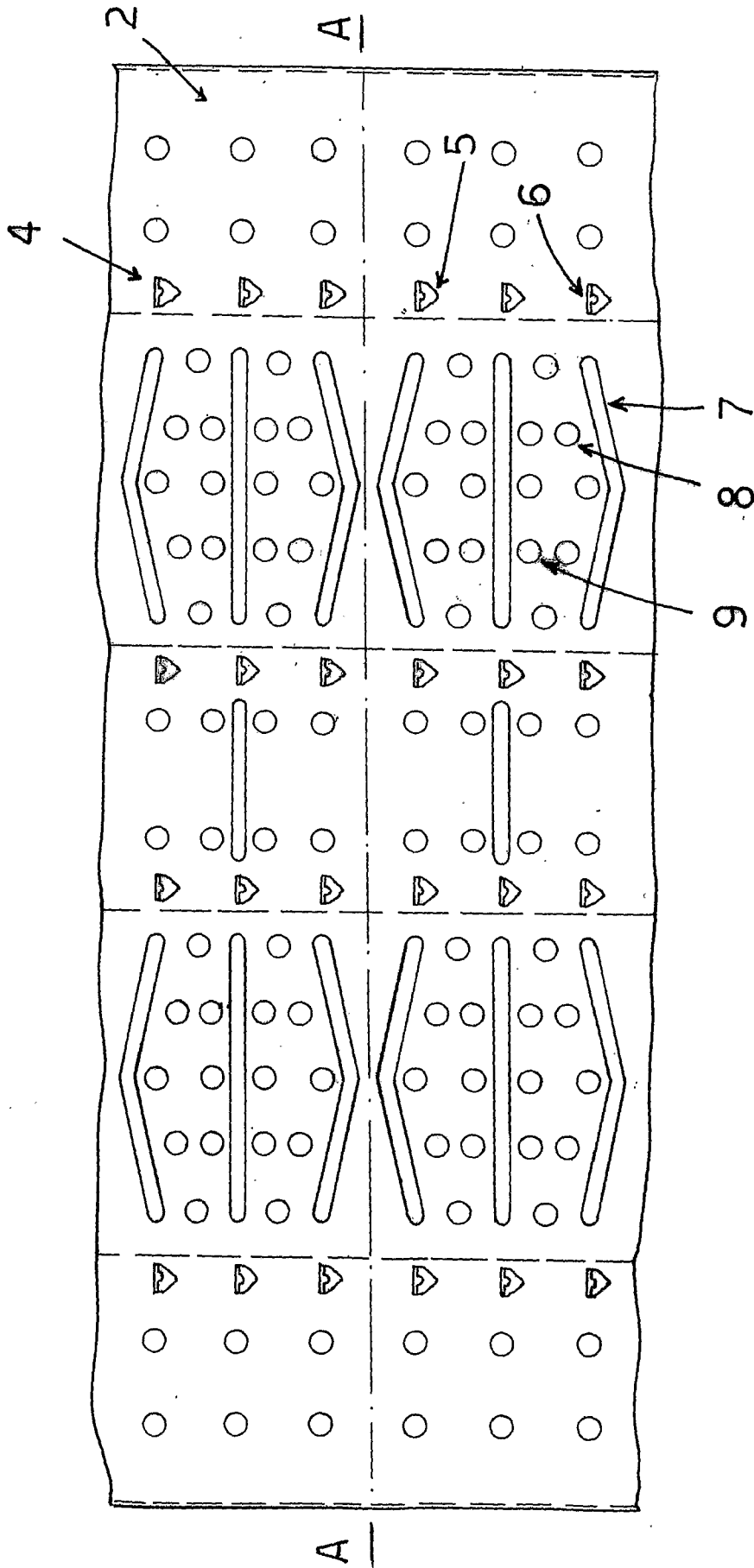
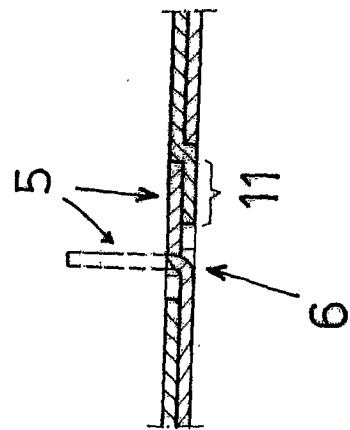
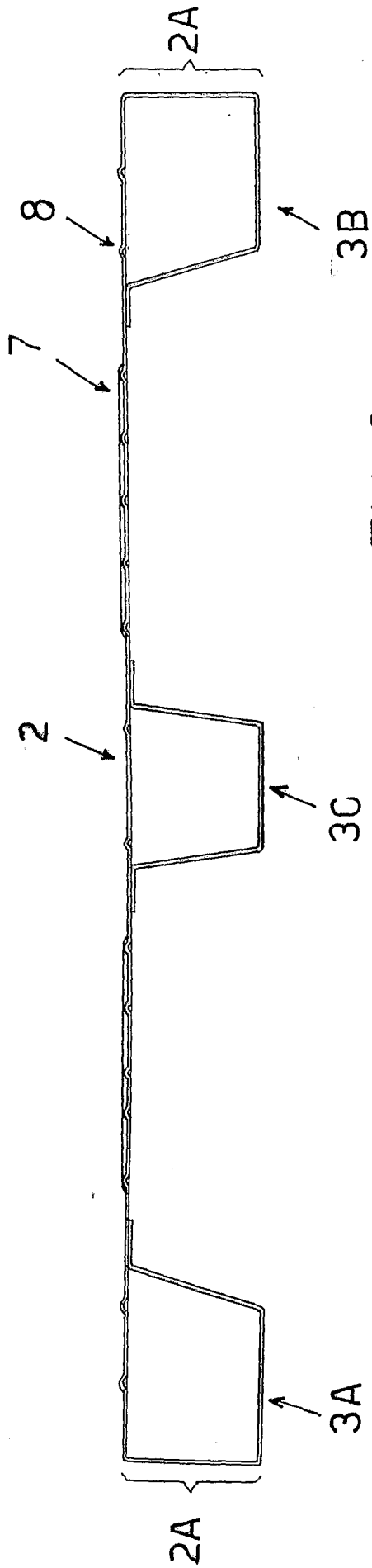


FIG 2



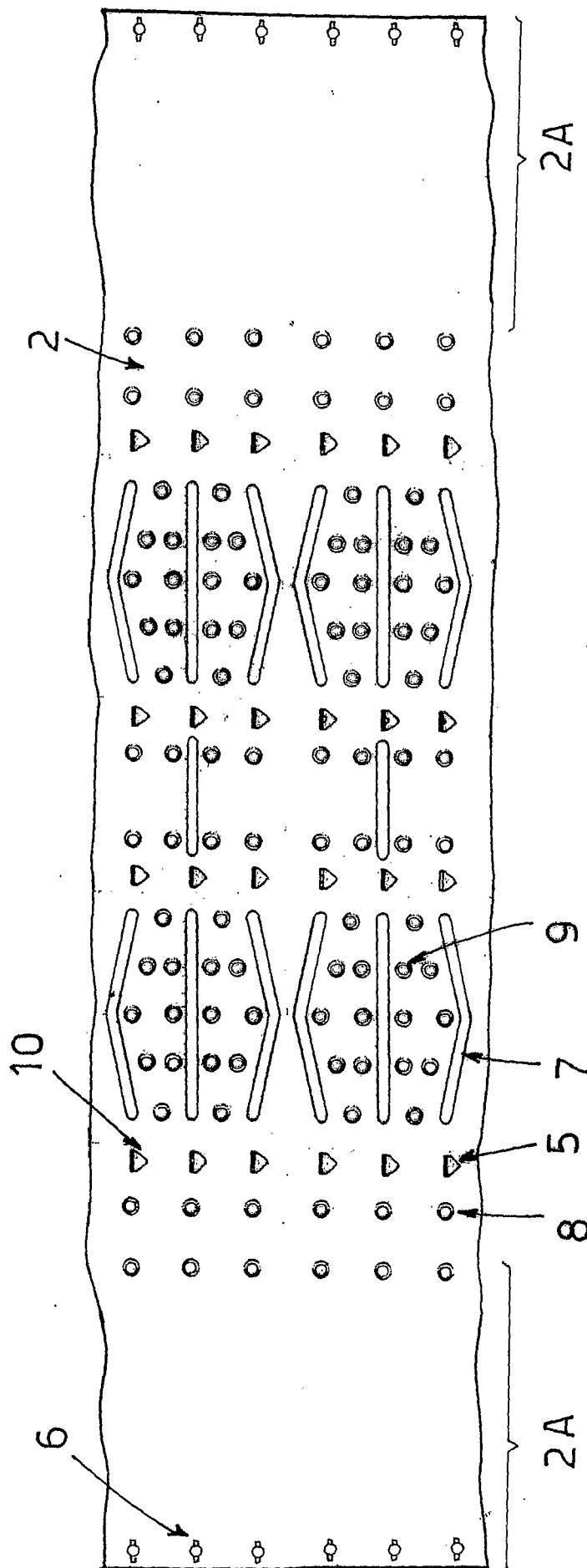


FIG 5

**INTERNATIONAL SEARCH REPORT**

International application No  
PCT/IT2008/000179

**A. CLASSIFICATION OF SUBJECT MATTER**  
 INV. E04G1/15 E04G5/08

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)  
 E04G

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, WPI Data

<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 443 137 A (WELSER WOLFGANG [AT]) 22 August 1995 (1995-08-22) abstract column 2, line 36 - line 51 column 3, line 9 - column 4, line 48 figures 1-5	1,6,7
Y	EP 1 211 367 A (PONTEGGI DALMINE SOC [IT]) 5 June 2002 (2002-06-05)  paragraphs [0012], [0013], [0016] - [0058]; claims 10-14; figures 5-7  ----- -/--	1,2, 4-12, 15-18

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

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| <p>* Special categories of cited documents :</p> <p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*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)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p> | <p>*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</p> <p>*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</p> <p>*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.</p> <p>*&amp;* document member of the same patent family</p> |
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Date of the actual completion of the international search  <b>4 December 2008</b>	Date of mailing of the international search report  <b>15/12/2008</b>
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer  <b>Beucher, Stefan</b>
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## INTERNATIONAL SEARCH REPORT

International application No

PCT/IT2008/000179

## C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE 195 15 062 A1 (LANGER RUTH GEB LAYHER [DE]) 31 October 1996 (1996-10-31)  column 1, line 53 - column 3, line 40 column 8, line 43 - line 52 column 9, line 46 - column 10, line 17 figures 7,9,12.1,12.2,13,14 -----	1,2, 4-12, 15-18
Y	EP 1 574 636 A (METSEC PLC [GB]) 14 September 2005 (2005-09-14) paragraphs [0015], [0016] -----	12
A	WO 2006/015602 A (PF MAN HOLDING APS [DK]; KROGSTRUP BOERGE [DK]) 16 February 2006 (2006-02-16) abstract page 2, line 7 - line 23 page 4, line 12 - line 21 page 4, line 32 - page 5, line 13 -----	1,6-9

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IT2008/000179

Patent document cited in search report	Publication date	Publication date	Patent family member(s)	Publication date
US 5443137	A	22-08-1995	NONE	
EP 1211367	A	05-06-2002	IT MI20002589 A1	30-05-2002
DE 19515062	A1	31-10-1996	NONE	
EP 1574636	A	14-09-2005	NONE	
WO 2006015602	A	16-02-2006	CA 2576420 A1 DK 176257 B1 EP 1797255 A1 US 2008093170 A1	16-02-2006 07-05-2007 20-06-2007 24-04-2008