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(71) Applicant: **ISOTECNICA S.p.A.**
Via Mezzavia, 72
I-35020 Carrara S.Giorgio (Padova)(IT)

(72) Inventor: **Boschello, Renzo**
Via Como, 1
I-35100 Padova(IT)

(74) Representative: **Cantaluppi, Stefano et al**
c/o Jacobacci-Casetta & Perani S.p.A. Via Berchet 9
I-35131 Padova(IT)

(54) A jointing arrangement between adjacent panels for erecting heat-insulative structures, and structure incorporating said arrangement.

(57) A jointing arrangement between adjacent panels for erecting heat-insulative structures comprising, on opposite longitudinal sides (4) of each panel, respective joint members formed integrally with their corresponding panel and being adapted to be joined to corresponding joint members on an adjacent panel using respective connector members, wherein the joint members comprise, on each side of each panel, two parallel, spaced-apart mortises (5a,b;6a,b) extending longitudinally along the corresponding panel side, and the connector members (8) are interposed to the corresponding mortises on adjacent panels and snap fitted to the panels.

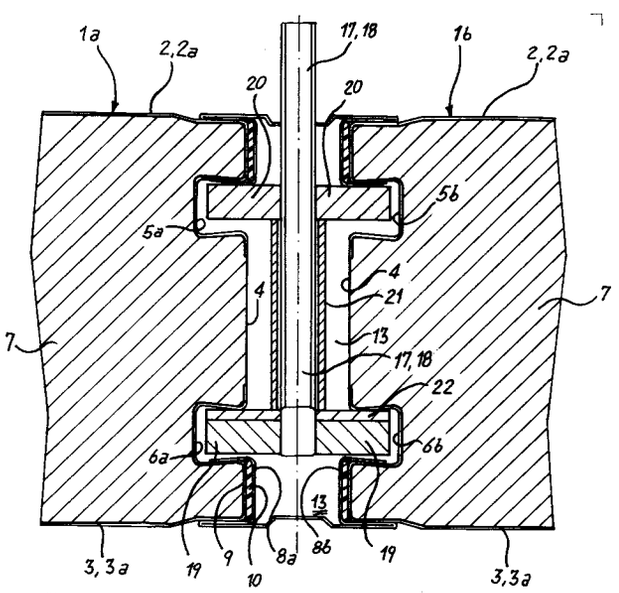

Fig. 1

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This invention relates to an arrangement for jointing adjacent panels in order to erect heat-insulative structures of the type comprising, on opposite longitudinal sides of each panel, respective joint members which are formed integrally with their respective panel and adapted to engage with corresponding joint members on an adjacent panel by means of respective connector members.

Panels and jointing arrangements therefor including the above-noted features are known from this Applicant's current production line.

Panels of this type, which are usually fabricated with a heat-insulative core of foamed resin sandwiched between two thin metal or plastics foils acting as reinforcements and boundaries for the resin, are customarily jointed together through end connections to erect refrigerated or controlled atmosphere rooms.

Depending on the heat level to be maintained within the room, different panels are employed which are jointed together using various joint arrangements. As an example, for temperatures below 0 ° C, arrangements are preferably used which are based on the injection of foamed resin at the joint between adjacent panels and include expedients effective to prevent the formation of metallic thermal bridges across the joints between the inner and the outer walls of the room. Where the panels are intended for erecting storage rooms at higher temperatures, so-called dry joints are used of preference, that is tongue-and-groove joints with no foamed resin injected between adjacent panels. Panels designed for this application usually have a female joint along one longitudinal side and a male joint along the opposed side.

In addition to a self-evident problem of panel manufacturing standardisation, the erection of rooms intended for sustained relatively low temperatures, particularly as regards the assembly of the two bands bordering the resin injection chambers between adjacent panels and the panel attachment to load-bearing structures existing on the site, such as purlins laid to support the room-forming panels, is relatively complicated.

It is current practice, in fact, to interconnect the aforesaid two bands by means of stays consisting of two screws, one for each band, being both threaded into a sleeve of a heat-insulative material to prevent metal thermal bridges between the opposite surfaces, respectively inside and outside the room, of the panels. For attachment to the purlins, two or more contiguous ties are connected together by means of a rail having a hook or the like grip formation attached thereto. This mount is a complex one. In addition, the hook setting on the panel must be determined accurately during the panel pre-assembling step.

The underlying problem of this invention is to provide a jointing arrangement which is structurally and functionally conceived to obviate all the drawbacks with which the cited prior art is beset.

This problem is solved by the invention using a jointing arrangement which includes the features mentioned in the preamble and is characterized in that said joint members comprise, on each side of each panel, at least two spaced-apart, parallel mortises which extend longitudinally of their respective panel side, and that said connector members are interposed between the corresponding mortises on adjacent panels and snap secured on the panels at the location of said mortises.

The invention will be now described in further detail with reference to some embodiments thereof, shown by way of illustration and not of limitation in the accompanying drawings, where:

Figure 1 is a cross-sectional view showing schematically a jointing arrangement for heat-insulative panels according to this invention;

Figure 2 is a cross-sectional view through the arrangement in Figure 1;

Figure 3 is a perspective view of a detail of the arrangement in the preceding figures;

Figures 4 and 5 show in cross-section two different embodiments of the invention as applied to so-called dry inter-panel joints;

Figures 6 and 7 show two further embodiments of connector members for use in the dry inter-panel joint of the arrangement according to the invention;

Figure 8 is an enlarged-scale sectional detail view of a further embodiment of this invention.

Respectively shown at 1a and 1b in the accompanying drawings are two heat-insulative panels (only partly depicted) which are used to erect an enclosed structure, e.g. a refrigerated room and/or controlled atmosphere room.

Each panel 1a,b comprises two opposite foils 2, 3 which are spaced apart and define respective panel walls 2a, 3a, being folded over at each longitudinal panel side 4 to form a respective channel-like, dovetail recess which will be referred to hereinafter as the mortise on account of its function.

Such mortises are respectively denoted by the reference numerals 5a, 6a and 5b, 6b on their respective panels 1a, 1b. The panel construction is completed by a heat-insulative layer, generally indicated at 7, of foamed resin interposed between the foils 2, 3.

For jointing together two adjacent panels used to erect a refrigerated room at relatively low temperature, so-called "foamed" joints are preferred which are of the type shown in Figures 1 and 2.

To this aim, the panels are connected together, in the joint region, by means of two oppositely located eaves, both indicated at 8, made of sheet

metal bent to the shape shown in Figure 3, thereby to define, along the opposite longitudinal edges, two formations 8a,b substantially C-shaped in cross-section, which are deformable elastically and adapted to snap fit over the corresponding bead 9 of each panel defined between the wall 2a, 3a and the corresponding adjacent mortise 5a,b and 6a,b, respectively.

Between each formation 8a,b and the panel bead 9 there is preferably interposed a seal 10. In one embodiment of the invention (Figure 8) this seal is a lip seal 10a having a web 10b received is a seat 10c formed in the corresponding back wall of the respective C-shaped formation 8a,b. Defined in the space between the sides 4 of the facing panels and the corresponding eaves 8 is an injection chamber 13 for a resin similar to resin 7 constituting the panel core and adapted to be foamed. This resin is injected through respective holes 11 formed at pitch distances along one of the eaves 8.

If necessary, during their implacement, the eaves 8 may be affixed to their respective panels by rivets 12 (Figure 3). This expedient, along with the possible provision of a central web on the eaves 8, can improve the resistance of the latter to the pressure generated inside the chamber 13 while the resin is being foamed.

Push-fit plugs 14 carrying a covering for the rivets 12 are provided to conceal the holes 11 after sealing the chamber 13.

In order to anchor the panels 1a,b to purlins 15 or the like load-bearing structures, hooking means are provided which include a hooked formation 16 braced by means of two stays 17, 18 to two corresponding flitches 19, 20 respectively received between the mortises 6a,b and 5a,b. Tubular spacers 21 are provided between the flitches 19, 20 which fit over their respective stays 17, 18 coaxially therewith.

Between the remote flitch 19 from the hooked formation (i.e. the one next to refrigerated space) and the corresponding mortises into which it is received, there intervenes a heat-insulative material 22. This is effective to prevent the formation of thermal bridges between the inner wall 3a to the refrigerated room and the outside.

In a simplified version (not shown) of the hooking means, the second flitch 20 and its stay 18 are omitted.

In Figures 4 to 7, there are shown so-called "dry" jointing arrangements specially, but not solely, useful in the erection of refrigerated rooms at temperatures above 0 °C. Similar parts to the ones already described are denoted by the same reference numerals.

With particular reference to the example of Figure 4, for jointing the panels 1a and 1b together, two identical tenons, both indicated at 30, are provided which are extruded from a suitable plastics, e.g. polyvinyl chloride. Thus, each tenon will have a rod-like shape having substantially the same length as the corresponding mortises and be approximately coincident, therefore, with the longitudinal extent of a panel.

Said tenons 30 snap fit, in a substantial mating shape relationship, into the two corresponding mortises 5a,b and 6a,b facing each other on the respective panels.

To facilitate the snap fit of the tenons in their respective mortises, the former are preferably shaped to present, in cross-section, two pairs of lugs, respectively shown at 31a,b for the first pair, and at 32a,b for the second pair, which are all substantially trapezoid in shape and united through opposite minor bases thereof. The lugs 31a,b and respectively 32a,b, of both pairs are disposed at a spacing from each other, as shown in the figure, for better deformability of the tenons.

In the example of Figure 4, the joint between the two panels 1a,b may be sealed with a conventional sealant, e.g. of the silicone variety. Alternatively, the tenons may have an integral joint covering as in the exemplary tenon shown in Figure 6. In that tenon 40, the joint covering comprises a substantially T-shaped projection 41 extending sideways from the tenon with its web co-planar with the minor bases of the lugs 31a,b and 32a,b.

In the example of Figure 5, the tenons 50 are arranged to hold the two panels 1a,b spaced apart. To this aim, the projection 51 forming the joint covering for the joint between the panels has two parallel webs 51a,b set mutually apart and extending square from one and the same flange 51c.

Similar in principle is the solution shown in Figure 7, wherein the two tenon-forming formations are made unitary with each other into a single connector member between the panels, as generally shown at 70. By providing tenons 50 or 70 with different widths, the spacing between adjacent panels can be changed accordingly and minor dimensional adjustments obtained for the wall of panels to be erected.

It is understood that, also in these examples of dry jointing arrangements for panels, any anchoring to purlins or the like load-bearing structures may be effected by using the previously described hooking means and breaking the corresponding tenon continuity over a length corresponding to the mortise region occupied by the flitches.

The jointing arrangement of this invention has several advantages over the known arrangement, valuable as these may be. First, full standardization of the panels is afforded, whether these be intended for dry joint or injected resin foam assembling.

Secondly, the manufacture and preparation of the latter joint type are made simpler by the snap fit of the eaves.

An additional, important advantage is that, at the room erection stage, the means for hooking on the purlins can be shifted, while achieving a more versatile and stronger anchoring for the panels.

Claims

1. A jointing arrangement between adjacent panels for the construction of heat-insulative structures, comprising, on opposite longitudinal sides of each panel, respective joint members which are formed integrally with their respective panel and adapted to engage with corresponding joint members on an adjacent panel by means of respective connector members, characterized in that said joint members comprise, on each side (4) of each panel, at least two spaced-apart, parallel mortises (5a,b;6a,b) which extend longitudinally of their respective panel side, and that said connector members (8) are interposed between the corresponding mortises (5a,b;6a,b) on adjacent panels and snap secured on the panels at the location of said mortises.

2. A jointing arrangement according to Claim 1, characterized in that said mortises have, in cross-section, a substantially dovetail shape.

3. A jointing arrangement according to either Claim 1 or 2, characterized in that said connector members are each comprised of an eave (8) adapted to interconnect adjacent panels in spaced-apart relationship, said eaves defining, in combination with the panels jointed thereby, respective injection chambers (13) for a heat-insulative resin.

4. A jointing arrangement according to Claim 3, characterized in that each eave (8) is provided, at its opposed longitudinal edges, with elastically deformable formations (8a,b) adapted to snap fit over a bead (9) defined between each mortise and the corresponding adjacent side wall (3) of one panel.

5. A jointing arrangement according to Claim 4, characterized in that said eave is tightly connected to its corresponding panels by means of a seal (10) intervening between each bead (9) and the corresponding elastically deformable formation (8a,b).

6. A jointing arrangement according to Claim 1, wherein said connector members are each comprised of a tenon formation (30) adapted to snap fit into each of the corresponding two mortises (5a,b;6a,b) facing each other on adjacent panels.

7. A jointing arrangement according to Claim 6, wherein each tenon formation (30) has two pairs of lugs (31a,b;32a,b) which have a substantially trapezoid cross-sectional shape and are juxtaposed in pairs with their respective minor bases, the lugs in each pair being disposed in mutually spaced apart relationship.

8. A jointing arrangement according to either Claim 6 or 7, wherein each tenon formation (30) comprises a substantially T-shaped projection effective to provide a joint covering for the joint between two panels.

9. A jointing arrangement according to one or more of Claims 6 to 8, wherein said tenon formations are formed integrally with a common rod-like rail (50,70) as protruding lugs therefrom.

10. A jointing arrangement according to Claim 10, characterized in that the oppositely corresponding lugs of each tenon formation are mutually spaced apart.

11. A jointing arrangement according to one or more of the preceding claims, wherein means (16-21) of hooking the panels to a load-bearing structure (15) are provided, said means including a hooked formation (16) anchored by at least one stay (17,18) to at least one flitch (19,20) received between the facing mortises (5a,b;6a,b) of two adjacent panels.

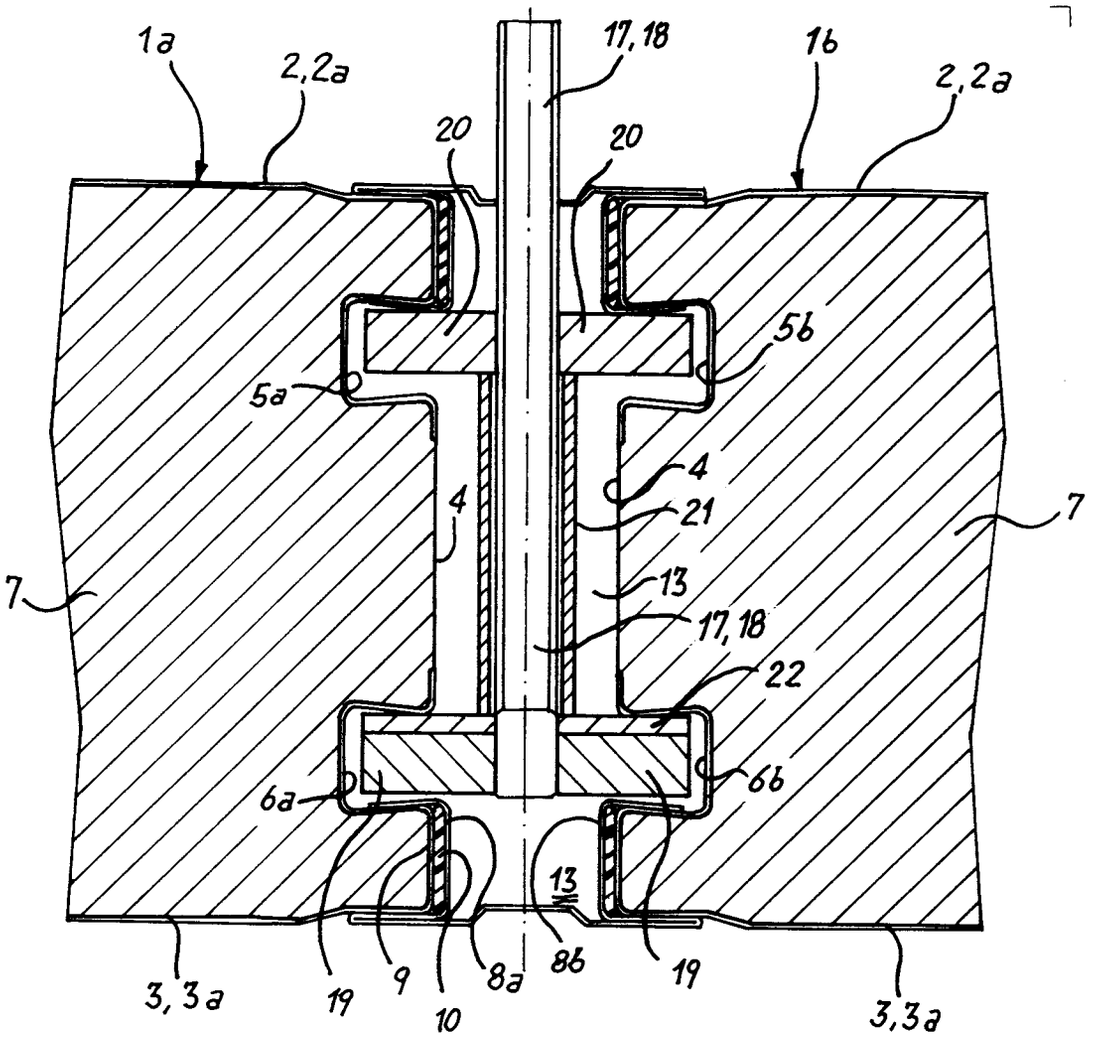
12. A jointing arrangement according to Claim 11, characterized in that said mortises are the remote ones from said hooked formation.

13. A jointing formation according to Claim 11 and/or 12, wherein a heat insulative material (21,22) is interposed between the flitch and the mortises.

14. A jointing arrangement according to one or more of Claims 11 to 13, comprising one flitch (19,20) for each pair of facing mortises (6a,b;5a,b), respective spacers (21) being interposed between said flitches.

15. A structure including at least two panels jointed to each other by a jointing arrangement according to one or more of the preceding claims, joined side-by-side to each other by a

jointing arrangement according to one or more of the preceding claims.


1a
2,2a
17,18
1b
2,2a
20
20
5b
5a
4
4
21
7
7
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17,18
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6a
6b
13
3,3a
19
9
10
8a
8b
19
3,3a

Fig. 1

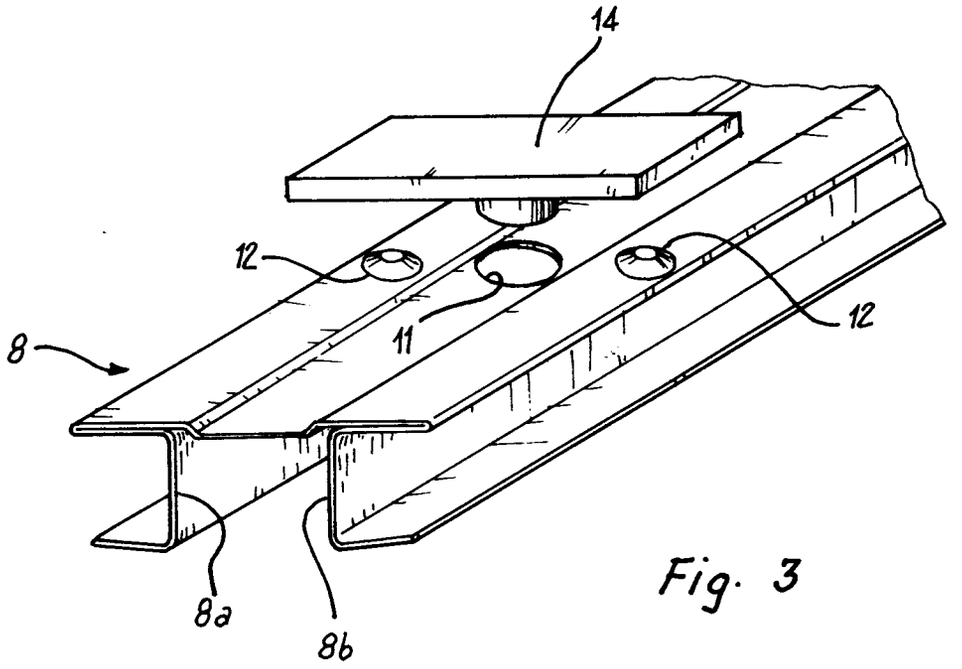
14
12
12
11
8
8a
8b

Fig. 3

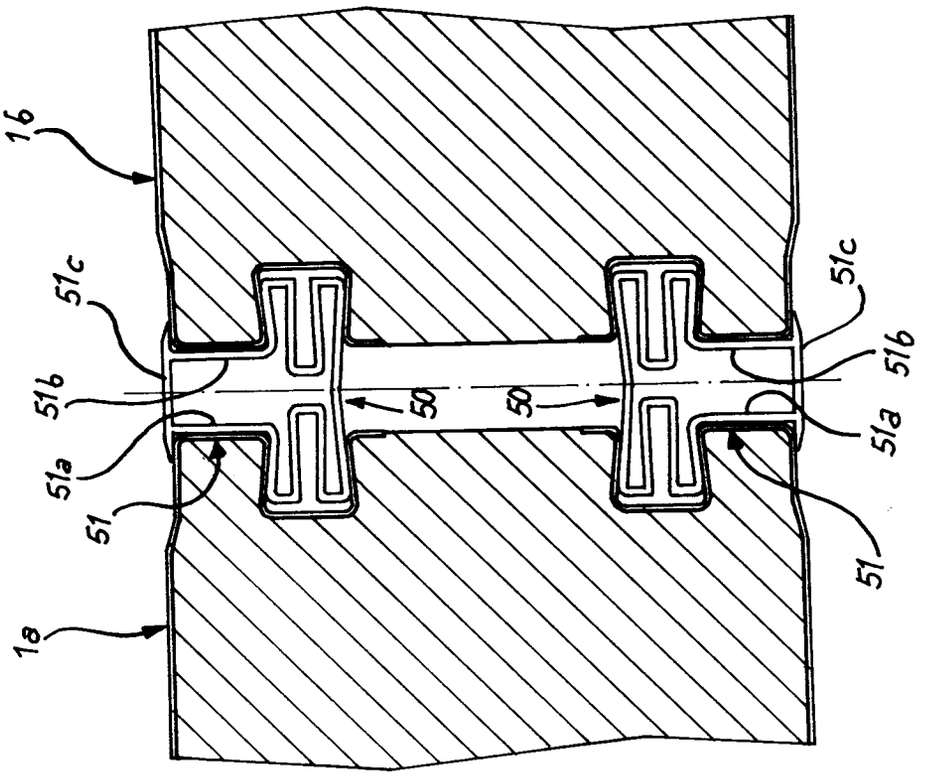
1b
51c
51b
51a
51
50
50
51c
51b
51a
51
1a

Fig. 5

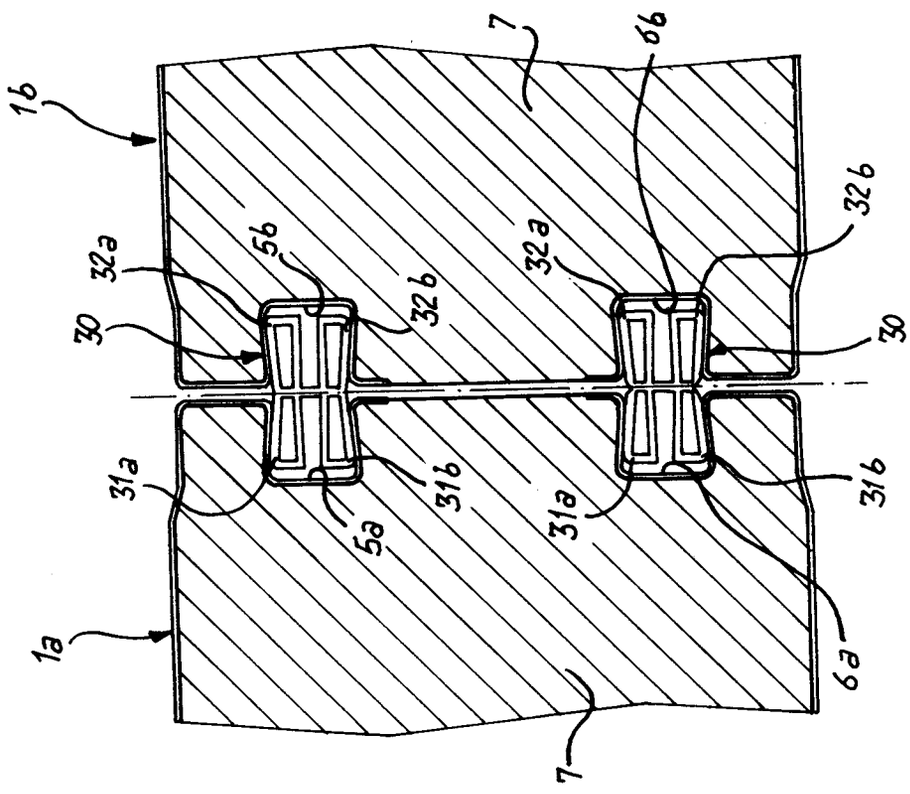
1b
7
6b
32a
5b
32b
32a
32b
30
30
31a
31b
5a
31a
31b
6a
1a
7

Fig. 4

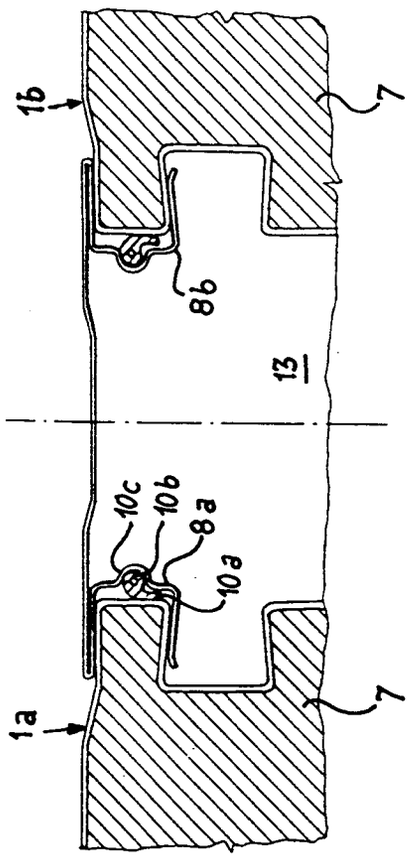

Fig. 8

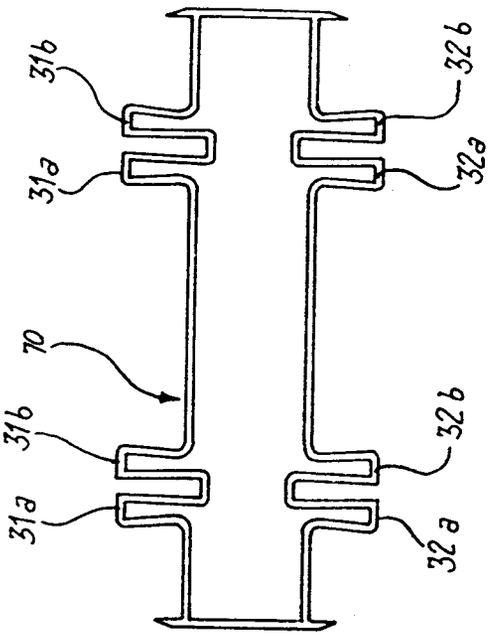

Fig. 7

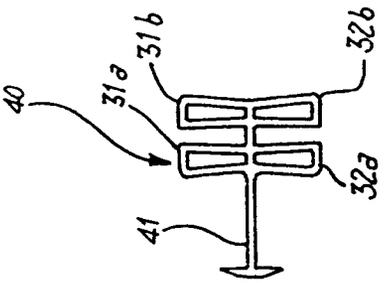

Fig. 6

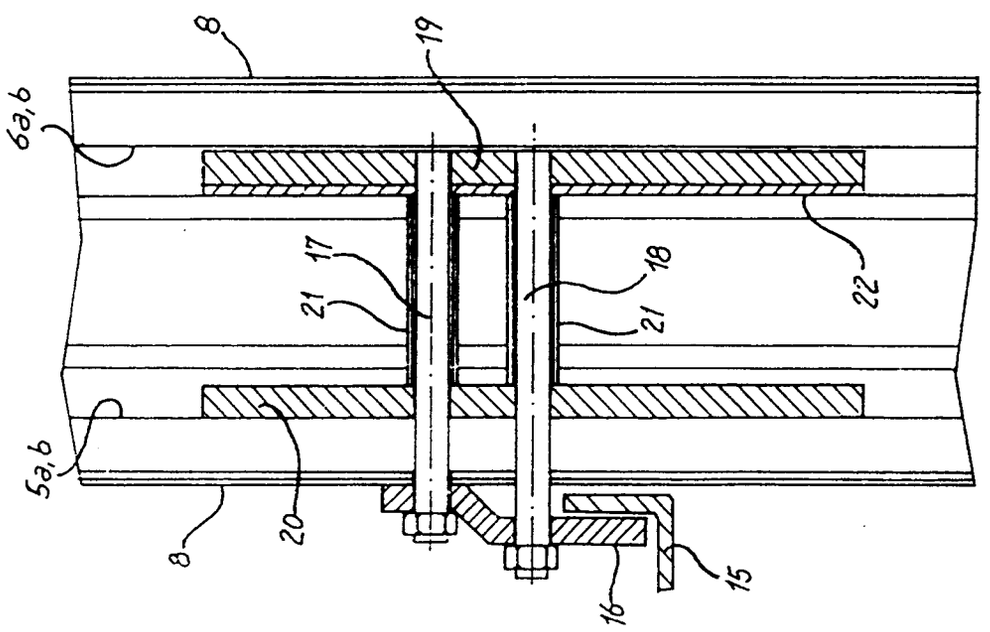

Fig. 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 11 0408

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	FR-A-2 085 408 (LAMINOIRS DE STRASBOURG) * page 2, line 4 - line 7; figure 1 * *	1	E 04 B 1/61
A	US-A-3 641 730 (MECKSROTH) * figures 1-4 * *	1,2,6	
A	US-A-3 632 149 (KONIG) * figures 1,7 * *	3,4,5	
A	FR-A-2 461 069 (ISOTECNICA) * page 4, line 13 - line 18; figure 3 * *	3	
A	US-A-3 417 529 (ARCHINAL ET AL.) * figures 2,3 * *	8	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
E 04 H E 04 B E 04 C F 16 B

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	22 October 91	MYSLIWETZ W.P.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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