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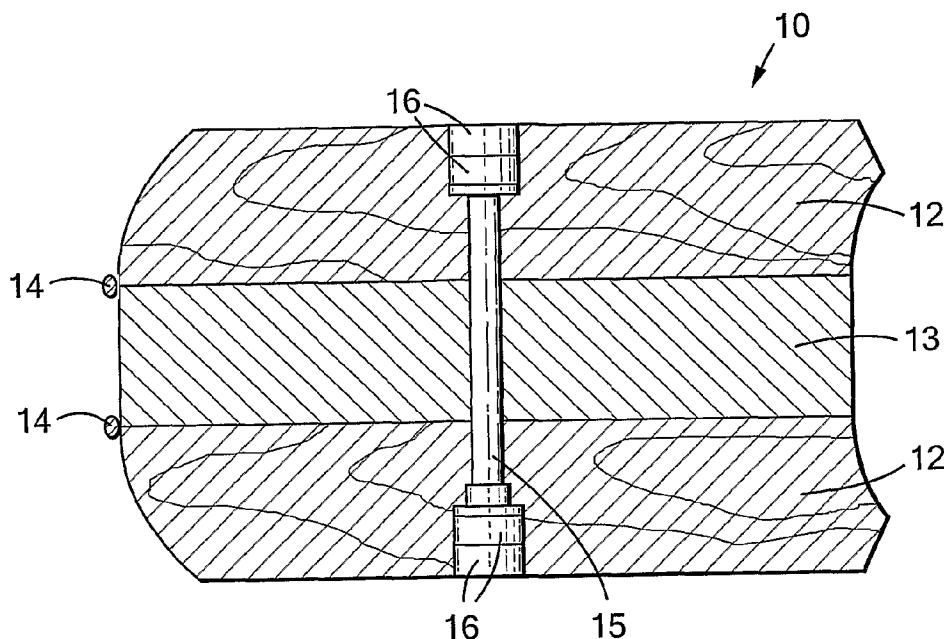
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(54) Title: BUILDING ELEMENT WITH INSULATION



(57) **Abstract:** The invention relates to a building element with insulation, comprising two elongated outer elements arranged in parallel side by side, at least one insulating element mounted between the outer elements, and fixing means for connecting the outer elements and the insulating element. The insulating element may be offset relative to the building elements in order to provide insulation between two elements stacked on top of each other, and in an embodiment the fixing means are made of a material with little thermal conductivity.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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.

Building element with insulation

The invention relates to a building element with insulation.

5 The "lafting" or log joint method of building with logs is a part of the historical building tradition in several countries, including Norway. The "lafting" process involves placing the logs on top of one another and joining them together at the corners. Each log is tailored to fit the next by cutting out a v-shaped groove under the log above. In order to insulate and prevent draughts between the logs, moss was used as a sealant between the logs and in the corner grooves. The weight of the timber together with the roof construction compresses the walls, keeping them sealed.

10 Modern building regulations have minimum requirements for wall insulation which mean that in practice houses cannot be built with timber. In order to satisfy these requirements, very thick timber has to be employed, and this is neither practical nor economically feasible.

15 NO 318375 relates to a laftable, log-like building element with external surfaces of wood or a wood-like material, internal bearing elements and an internal insulating layer.

20 NO 318394 relates to a building element intended for lafting, comprising side walls of a single wooden or wood-like board, the inside of which is provided with a layer of plastic. To the inside of each board is attached a number of frames that give the side walls dimensional stability. An insulating material may also be inserted inside the building element.

25 SE 318 984 relates to a building element in the form of a beam with tongue and groove and with an insulating material placed between two profiled wooden half-beams. At one beam edge, the insulating material forms a tongue that extends into the middle of a groove.

The object of the invention is to provide a building element with insulation, particularly a log-type building element, which is easy to produce and provides good insulation.

30 The object of the invention is achieved by means of the features in the patent claims.

A building element according to the invention comprises two elongated outer elements arranged in parallel side by side, at least one insulating element mounted between the outer elements and fixing means for connecting the outer elements and the insulating element.

35 The elongated outer elements are preferably made of wood, for example by dividing a log into two or more parts along the longitudinal direction with the result that the

outer elements are composed of two parts of the log. The end portions of the outer elements may be adapted for lafting, where for example in an embodiment the log may be adapted for lafting with a recessed groove near both ends of the log.

5 The outer elements may comprise holes or recesses for receiving fixing means. In an embodiment the outer elements comprise through-going holes for passing through bolts. Other possible embodiments include grooves for accommodating straps and/or holes for insertion of bolts may have an additional recess for inserting plugs.

10 In an embodiment the outer elements may also comprise notches on the surfaces facing the insulating element. The object of these notches is to prevent warping and bending of the outer elements relative to one another and to the insulating element.

The outer elements may also comprise several elements connected to one another/combined to form laminated elements. This may be implemented, for example, by dividing a log into several parts and joining the parts together by
15 gluing, thereby forming two separate outer elements consisting of several glued together log elements. A construction of this kind will further prevent warping and bending of the outer elements.

The insulating element may be made of any suitable insulating material such as, for example, polyurethane foam, polyurethane sheets, expanded and extruded
20 polystyrene, mineral wool, etc.

The insulating element may come in different lengths and shapes. In an embodiment the insulating element extends along the full length of the building element, while in another embodiment it may be of a shorter length than the outer elements.

25 The insulating element is generally elongated in shape and approximately the same height as the outer elements. In an embodiment the insulating element is mounted between the outer elements in such a manner that a part of the insulating element extends over the outer elements in the height direction while the outer elements extend below the lower part of the insulating element, i.e. the insulating element is offset in the height direction relative to the outer elements.

30 In an embodiment at least one end element is connected to the insulating element. In an embodiment the length of this/these end element/s is such that the total length of the end elements and the insulating element is equal to the length of the outer elements. In an embodiment the end element may be mounted between the outer elements at the ends, but at a distance from the insulating element. In an
35 embodiment the transition between the insulating element and the end elements is provided near or in the middle of the joining area for lafting. In this fashion a room/house constructed by lafting building elements according to the invention will

have insulation along the full length of the walls, while the part of the wall/elements projecting outside the house (i.e. the rafted corners) have no insulation.

The fixing means connect the outer elements to one another and to the insulating element and possibly the end elements. The fixing means may be of any suitable type, but it is particularly advantageous to employ fixing means with little thermal conductivity, for example made of a plastic material or wood. In an embodiment the fixing means are bolts extending through at least the outer elements. Other examples of fixing means may be glue, other adhesives, straps and the like or a combination of these and bolts. In an embodiment the fixing means are bolts extending through the outer elements and the insulating element.

The invention will now be described in more detail by means of examples with reference to the enclosed figures.

Figure 1 is a cross section of a building element according to an embodiment of the invention.

Figure 2 is a cross section of a building element according to a second embodiment of the invention.

Figure 3 illustrates elements of a building element according to the invention before assembly.

Figure 4 is a longitudinal section of a building element according to an embodiment of the invention.

Figure 1 illustrates a cross section of a building element 10 according to an embodiment of the invention. The building element 10 comprises two elongated outer elements 12, produced, for example, by dividing a log lengthwise. In the figures a construction is illustrated consisting of two parts of a log, but as described above each of these parts may in turn consist of several parts joined to form a laminate. The outer elements 12 are arranged side by side at the same height. Between the outer elements 12 is mounted an insulating element 13 such as, for example, a polyurethane sheet. The insulating element 13 is mounted level with the upper and lower edge of the outer elements 12. On the top of the outer elements 12 and the insulating element 13 additional insulating material 14 may be provided, for example polyurethane foam in order to provide a seal between it and the overlying building element. This additional insulating material 14 may, for example, be provided in the transitional area between the insulating element 13 and the outer elements 12. The building element 10 also comprises bolts 15 extending through the entire width of the building element 10, constituting fixing means for holding the elements of the building element 10 together. The bolts 15 may be passed through through-going holes in the outer elements 12 and the insulating element 13. In this

embodiment the outer elements 12 also comprise recesses for receiving plugs 16 mounted outside the bolts 15 in order to conceal them.

Figures 2a and 2b illustrate a cross section of a building element 20 according to a second embodiment of the invention. In this embodiment the insulating element 22 is mounted offset in the height direction relative to the outer elements 21. The insulating element 22 measures slightly less in the height direction than the outer elements 21, with the result that when several building elements are assembled on top of one another as illustrated in figure 2b, a small space 23 will be created between adjacent insulating elements 22, 22'. In other respects this embodiment may also comprise all the remaining features illustrated in the embodiment in figure 1. In figure 2a it can also be seen that through-going holes 27 are provided in the outer elements 21 and the insulating element 22 for insertion of bolt 25 which constitutes the fixing means for connecting the outer elements 21 and the insulating element 22. Plugs 26 are inserted in the recesses at the outer edge of the through-going hole 27 in order to conceal the plugs and further contribute towards a minimum of thermal transmittance.

Figure 3 is a perspective view of elements of a building element 30 according to the invention before assembly. The building element 30 comprises two outer elements 32 and an insulating element 33. The insulating element 33 has a length that is shorter than the outer elements 32. Two end elements 31, 31' are provided connected with the insulating element 33 with the result that the total length of the insulating element 33 and the end elements 31, 31' is the same as the length of the outer elements. The transition between the insulating element 33 and the end elements 31, 31' is provided in the joining area for lafting, so that the visible part of the building element after lafting gives the impression of being a solid timber/lafting log. The part of the building element located outside the joining area does not contribute to the insulating properties, and there are therefore no drawbacks with this embodiment with regard to insulation.

Figure 4 illustrates a longitudinal section of a building element 40 according to an embodiment of the invention. This embodiment corresponds to the building elements illustrated in figure 3 and may comprise all the elements illustrated in figure 1 and/or 2. In this embodiment four bolts 42 are provided as fixing means for connecting the outer elements 41 and the insulating element 44. The insulating element 44 may, for example, be a polyurethane sheet which is further attached to the outer elements 41 by means of an adhesive 45 such as, for example, polyurethane foam.

CLAIMS

1. A building element with insulation,
characterised in that it comprises
 - two elongated outer elements arranged in parallel side by side,
 - at least one insulating element mounted between the outer elements, and
 - fixing means for connecting the outer elements and the insulating element.
2. A building element according to claim 1,
characterised in that the insulating elements are offset in the height
direction relative to the outer elements.
3. A building element according to claim 1,
characterised in that the insulating element extends along the full length
of the building element.
4. A building element according to claim 1,
characterised in that the insulating element is shorter in length than the
outer elements.
5. A building element according to claim 1,
characterised in that at least one end element is connected to the
insulating element, and that the total length of the end elements and the
insulating element is equal to the length of the outer elements.
6. A building element according to claim 1,
characterised in that the outer elements are two parts of a log.
7. A building element according to claim 1,
characterised in that the end portions of the outer elements are adapted
for lifting.
8. A building element according to claim 1,
characterised in that the fixing means are bolts extending through at least
the outer elements.
9. A building element according to claim 1,
characterised in that the fixing means are bolts extending through the
outer elements and the insulating element.
10. A building element according to one of the preceding claims,
characterised in that the fixing means are made of a non-thermally
conductive material.

11. A building element according to claim 4 or 5,
characterised in that the fixing means are made of a plastic material or of
wood.
 12. A building element according to claim 1,
characterised in that the outer elements contain through-going holes.
- 5

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Fig.1.

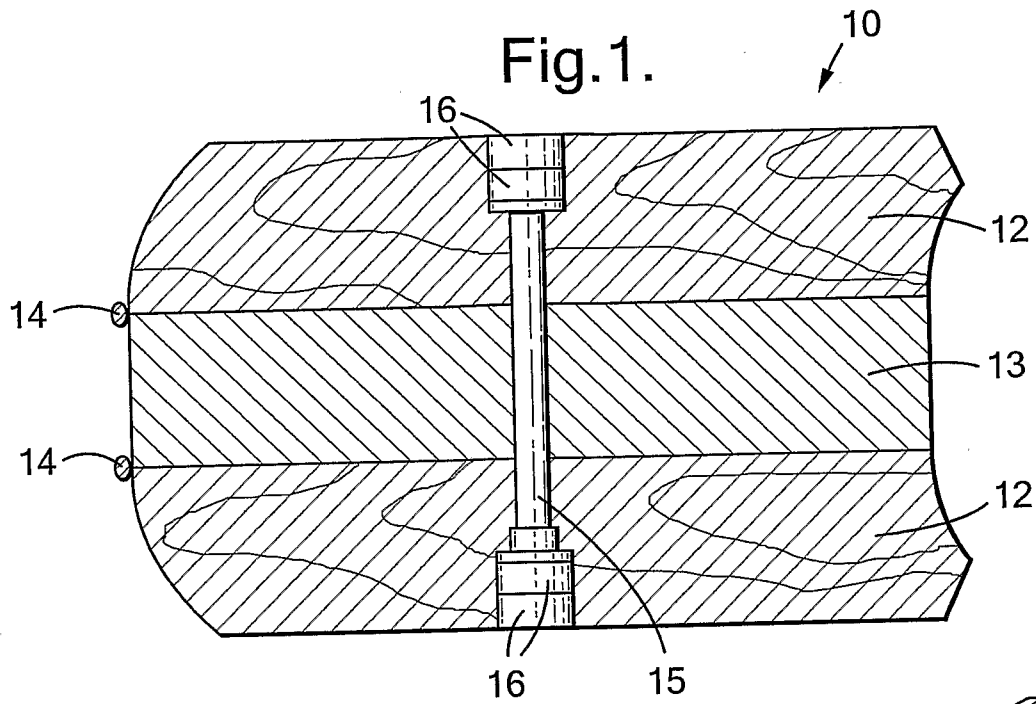


Fig.3.

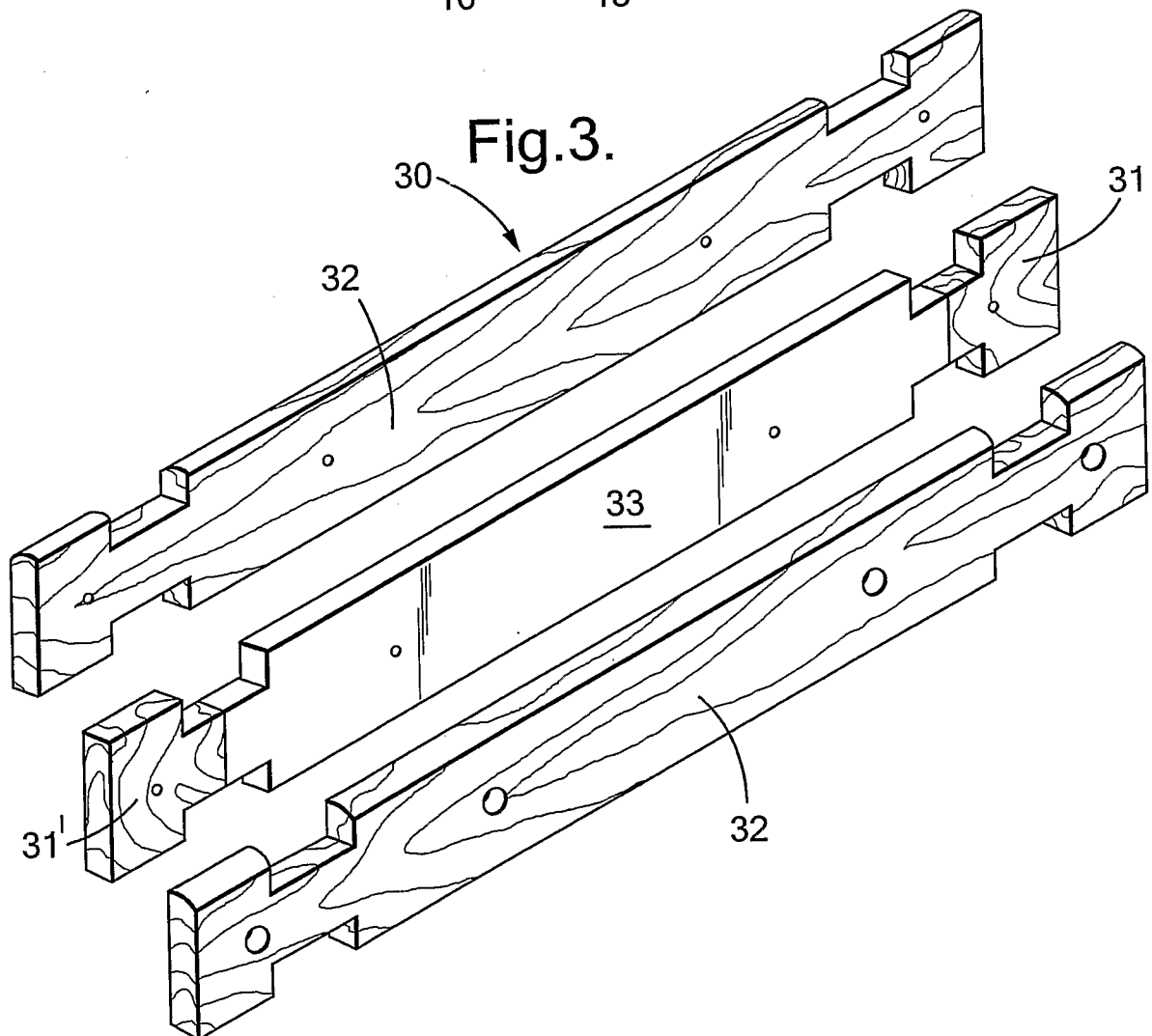


Fig.2a. 2/3

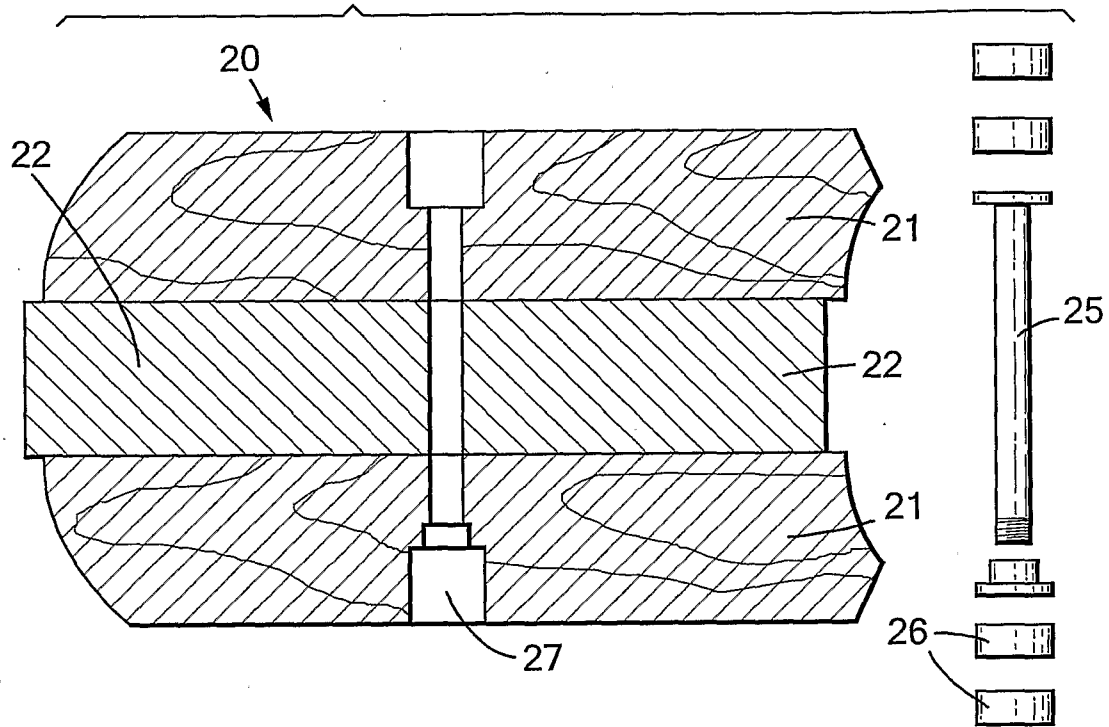


Fig.2b.

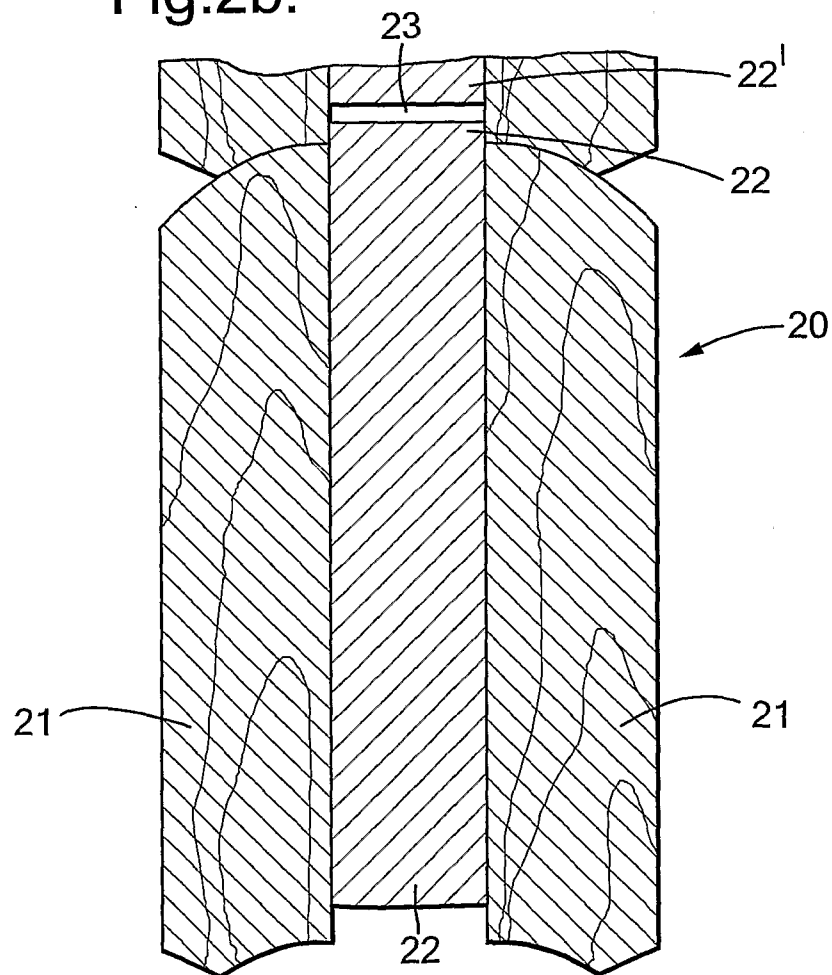
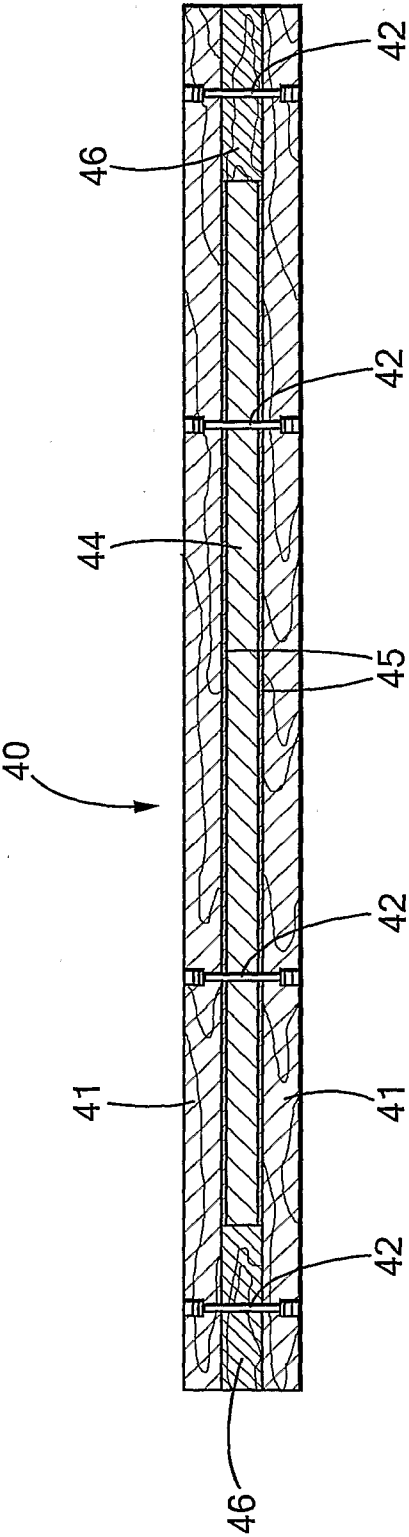


Fig.4.



INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER INV. E04B2/70		
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Electronic data base consulted during the international search (name of data base and where practical search terms used) EPO-Internal , WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate of the relevant passages	Relevant to claim No
X	CA 2 326 054 A1 (MCDERMID DICKIE WALLACE [CA]) 10 May 2002 (2002-05-10) page 11, line 16 - page 13, line 14; figures 1-9 -----	1-3,6,8,9,12
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<div style="display: flex; justify-content: space-between; align-items: center;"> D Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex </div>		
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Information on patent family members

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