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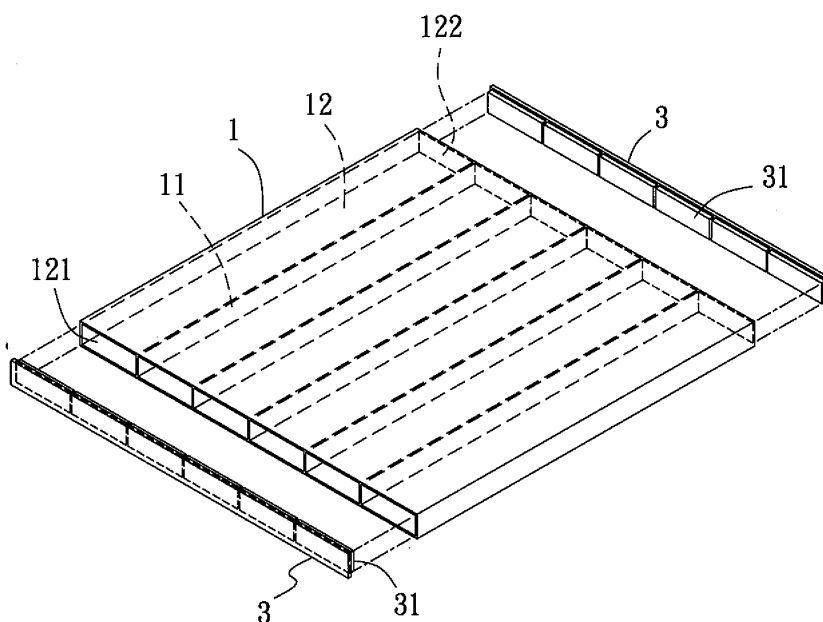
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(54) **Double-walled multi-chamber panel for building**

(57) A double-walled panel for building includes a double-walled main body (1) defining an inner space and two opposite open sides, and being internally provided with a plurality of spacing boards (11) to divide the inner space into a plurality of chambers (12), and each of the chambers having two opposite open ends (121,122) at the two open sides of the main body; a working liquid

stored in the chambers in the main body; and at least two sealing covers (3) for sealing the two open sides of the main body as well as the two open ends of each of the chambers. The double-walled panel may be used as a ceiling panel or a partition panel. The working liquid stored in the chambers not only helps in lowering indoor temperature in normal use conditions, but also helps in putting out fire when the building is on fire.



**Fig. 1**

## Description

### FIELD OF THE INVENTION

**[0001]** The present invention relates to a panel for use in a building, and more particularly to a double-walled panel for building that not only helps in lowering indoor temperature in normal use conditions, but also helps in putting out fire when the building is on fire.

### BACKGROUND OF THE INVENTION

**[0002]** Generally, a conventional ceiling structure includes at least a set of lightweight steel frames connected to an inside roof of a room, and a plurality of plastic panels or gypsum panels is supported on the lightweight steel frames.

**[0003]** The plastic panels and the gypsum panels supported on the lightweight steel frames are only decorative panels without the function of lowering indoor temperature. Moreover, the plastic panels and the gypsum panels are easily burned and damaged in a fire to produce a large amount of black smoke and toxic gases, which increase people's difficulty in safely leaving the building on fire to result in increased number of injured and dead persons.

### SUMMARY OF THE INVENTION

**[0004]** A primary object of the present invention is to provide a double-walled panel for use as a ceiling panel and/or a partition panel in a building, so that the panel not only helps in lowering indoor temperature in normal use conditions, but also helps in putting out fire when the building is on fire.

**[0005]** To achieve the above and other objects, the double-walled panel according to the present invention includes a double-walled main body defining an inner space and two opposite open sides, and being internally provided with a plurality of spacing boards to divide the inner space into a plurality of chambers, and each of the chambers having two opposite open ends at the two open sides of the main body; a working liquid stored in the chambers in the main body; and at least two sealing covers for sealing the two open sides of the main body as well as the two open ends of each of the chambers. The double-walled panel may be used as a ceiling panel or a partition panel.

**[0006]** The working liquid stored in the chambers not only helps in lowering indoor temperature in normal use conditions, but also helps in putting out fire when the building is on fire.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0007]** The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the follow-

ing detailed description of the preferred embodiments and the accompanying drawings, wherein

**[0008]** Fig. 1 is an exploded perspective view of a double-walled panel for building according to a preferred embodiment of the present invention;

**[0009]** Fig. 2 is an assembled view of Fig. 1;

**[0010]** Fig. 3 is a sectional view taken along line A-A of Fig. 2;

**[0011]** Fig. 4 shows the installation of the double-walled panels of the present invention for use as ceiling panels; and

**[0012]** Fig. 5 is an enlarged sectional view of the circled area "a" of Fig. 4.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[0013]** Please refer to Figs. 1 and 2 that are exploded and assembled perspective views, respectively, of a double-walled panel for building according to a preferred embodiment of the present invention, and to Fig. 3 that is a sectional view taken along line A-A of Fig. 2. As shown, the double-walled panel of the present invention includes a main body 1, a working liquid 2, and at least two sealing covers 3.

**[0014]** The main body 1 is double-walled to define an inner space and two opposite open sides, and may be made of a plastic material. The double-walled main body 1 is internally provided with a plurality of spacing boards 11 to divide the inner space into a plurality of chambers 12, such that each of the chambers 12 has two opposite open ends 121, 122 at the two open sides of the main body 1.

**[0015]** The working liquid 2 is stored in the chambers 12 in the main body 1, and may be water or other suitable liquids.

**[0016]** The sealing covers 3 are connected to the two opposite open sides of the main body 1 to seal the open ends 121, 122 of all the chambers 12. Each of the sealing covers 3 is provided on one surface facing toward the main body 1 with a plurality of insert portions 31 for separately inserting into the open ends 121, 122 of the chambers 12 to seal the same.

**[0017]** Please refer to Fig. 4 that shows the installation of the double-walled panels of the present invention for use as ceiling panels in a building, and to Fig. 5 that is an enlarged sectional view of the circled area "a" of Fig. 4. As shown, to use the double-walled panels of the present invention as a ceiling panels, simply install the already sealed main body 1 of the double-walled panels on a predetermined framework 4, such as a lightweight ceiling suspension system. Of course, the double-walled panels of the present invention may also be used as interior partition panels.

**[0018]** The working liquid 2 in the sealed chambers 12 of the double-walled main body 1 provides the function of lowering indoor temperature when the environment in which the double-walled panel is used is in normal con-

ditions. In the event the building using the double-walled panels is on fire, the working liquid 2 in the sealed chambers 12 of the main body 1 would be heated and vaporized due to the surrounding high temperature. The vaporized working liquid 2 results in expansion and final breaking of the plastic main body 1, so that the working liquid 2 in the chambers 12 of the main body 1 flows out of the damaged main body 1 onto burning things to help in extinguishing the fire. 5

**[0019]** With the working liquid 2 stored in the chambers 12, the double-walled panel for building according to the present invention not only helps in lowering indoor temperature in normal use conditions, but also helps in putting out fire, if the building is on fire unfortunately. Therefore, the present invention effectively overcomes the problems in the conventional plastic and gypsum panels and is very practical for use. 10 15

**[0020]** The present invention has been described with a preferred embodiment thereof and it is understood that many changes and modifications in the described embodiment can be carried out without departing from the scope and the spirit of the invention that is intended to be limited only by the appended claims. 20

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## Claims

### 1. A double-walled panel for building, comprising:

a double-walled main body defining an inner space and two opposite open sides, and being internally provided with a plurality of spacing boards to divide the inner space into a plurality of chambers, and each of the chambers having two opposite open ends at the two open sides of the main body; 30 35

a working liquid stored in the chambers in the main body; and

at least two sealing covers for sealing the two open sides of the main body as well as the two open ends of each of the chambers. 40

2. The double-walled panel for building as claimed in claim 1, wherein the main body is made of a plastic material. 45

3. The double-walled panel for building as claimed in claim 1, wherein the working liquid is water.

4. The double-walled panel for building as claimed in claim 1, wherein each of the sealing covers is provided on one surface facing toward the main body with a plurality of insert portions for separately inserting into the open ends of the chambers to seal the same. 50 55

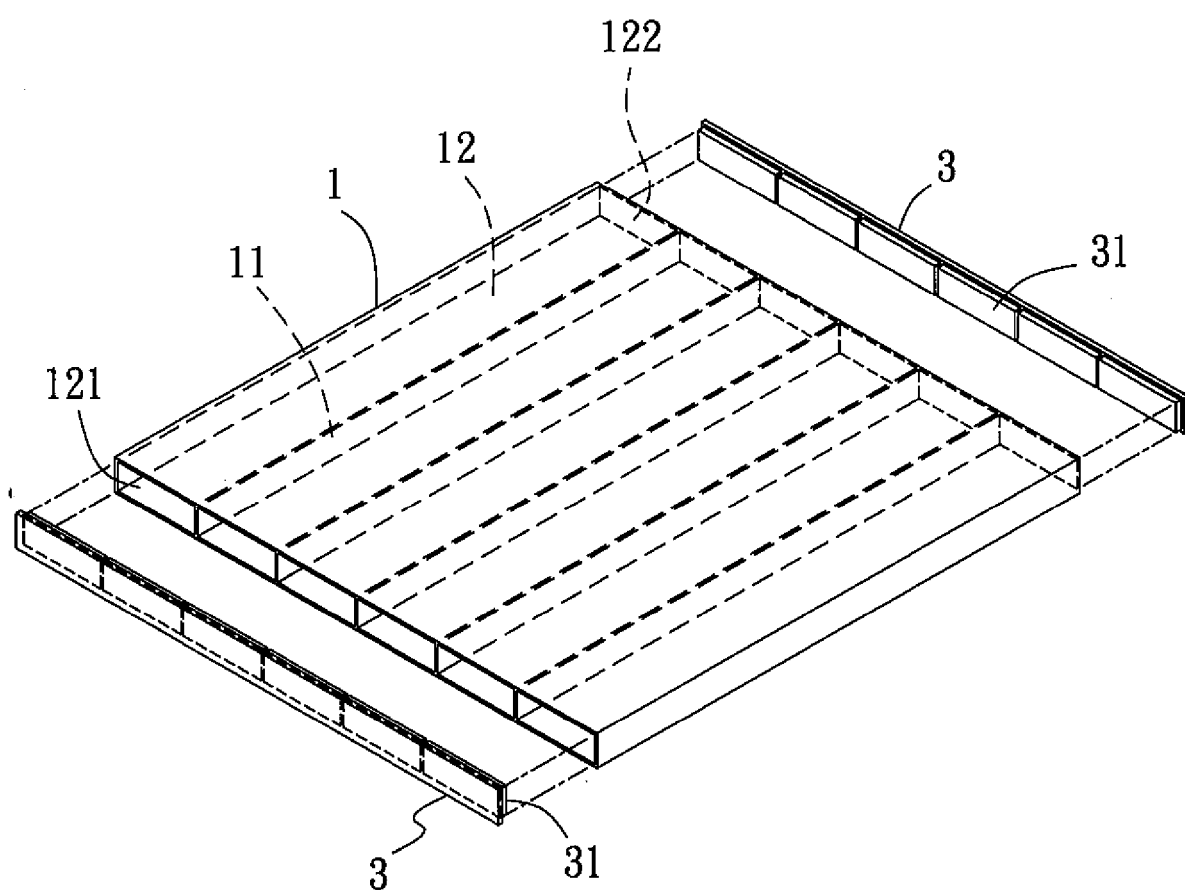


Fig. 1

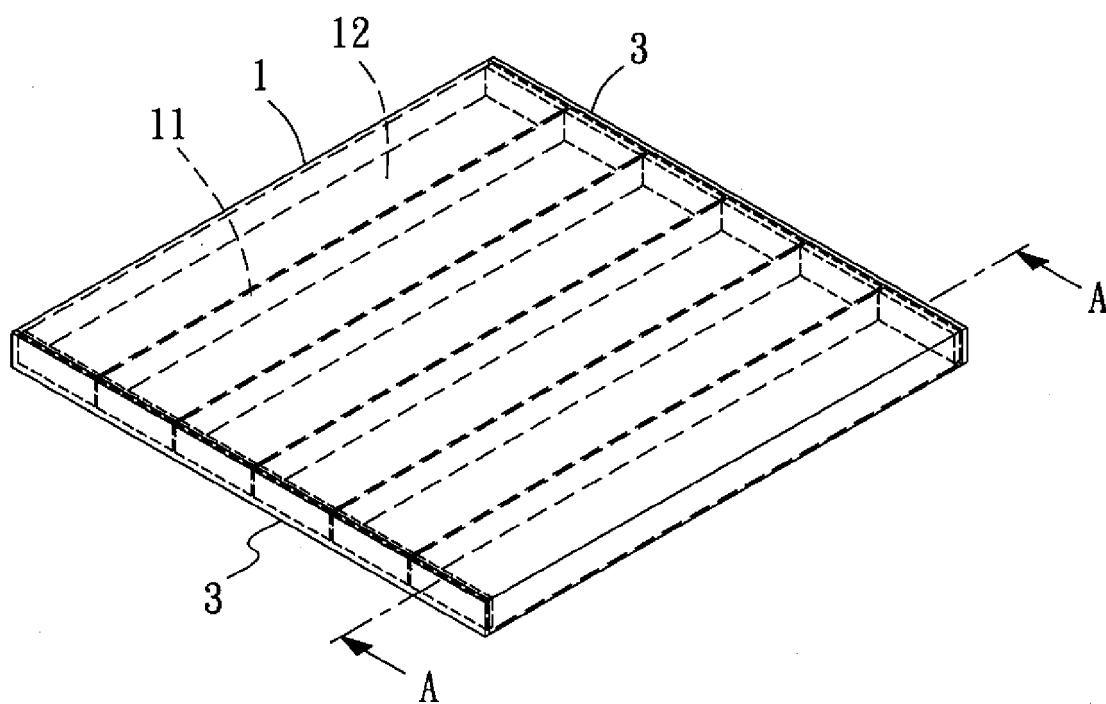
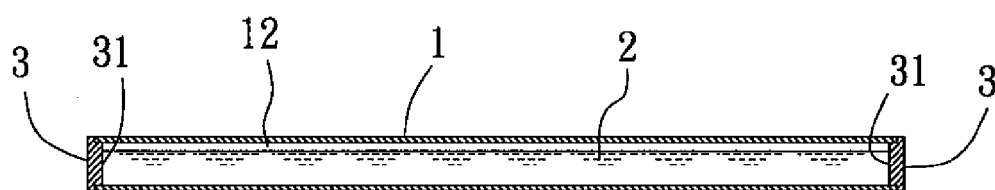


Fig. 2



A-A

Fig. 3

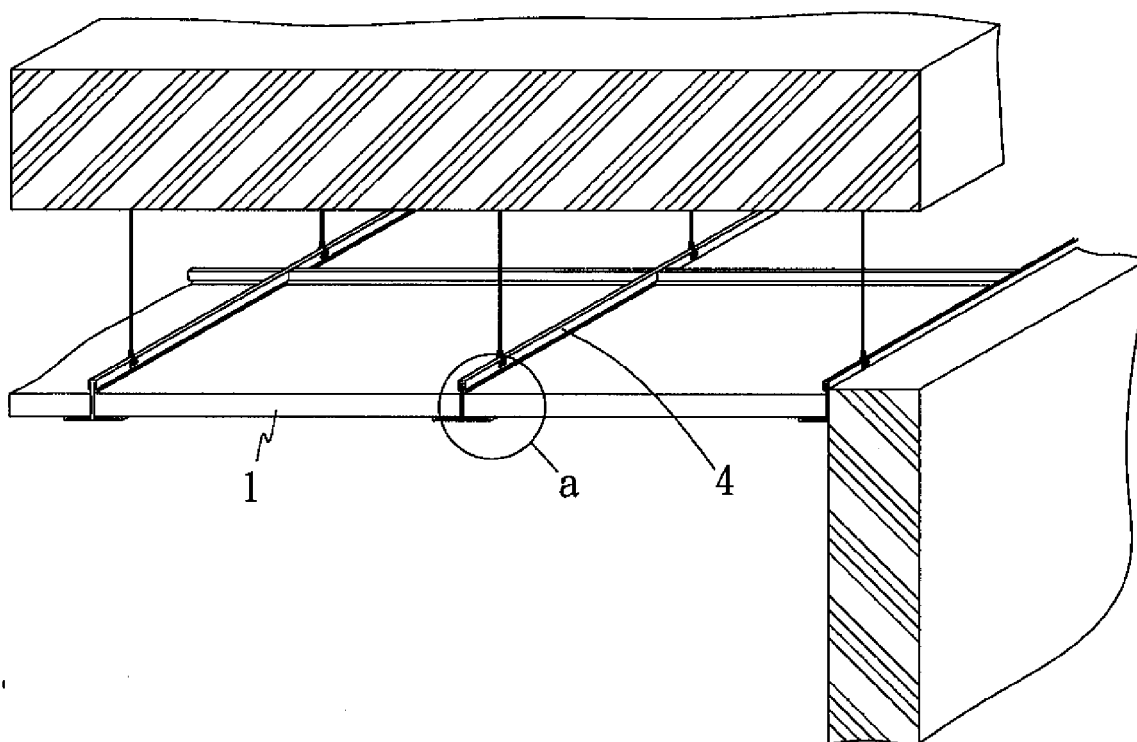


Fig. 4

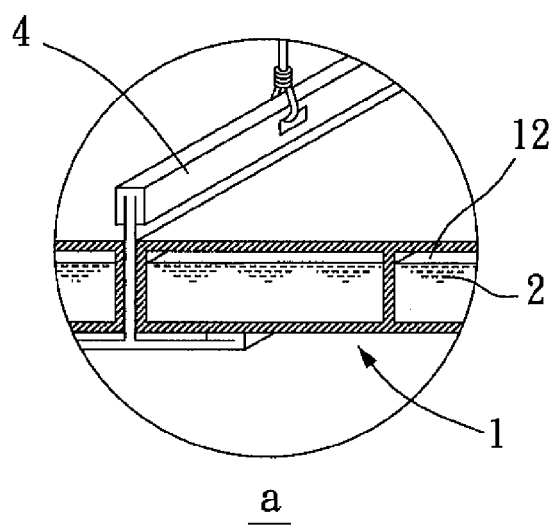


Fig. 5



## EUROPEAN SEARCH REPORT

Application Number  
EP 08 16 3138

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                             |                                  |                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages                                                               | Relevant to claim                | CLASSIFICATION OF THE APPLICATION (IPC)                           |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | WO 01/49372 A (FRICK ADOLF [CH])<br>12 July 2001 (2001-07-12)<br>* page 7, line 27 - page 10, line 36;<br>claims 4,6-8; figure 4 *<br>----- | 1-4                              | INV.<br>E04B1/94<br>E04C2/34<br>E04C2/20<br>E04C2/52<br>F28D20/02 |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | GB 1 098 681 A (REVERE COPPER & BRASS INC)<br>10 January 1968 (1968-01-10)<br>* page 3, line 88 - line 114; figures<br>11,13,14 *<br>-----  | 1-4                              | ADD.<br>E04B9/00                                                  |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | WO 92/07150 A (ZALOTAY ELEMER [CH])<br>30 April 1992 (1992-04-30)<br>* abstract; figures 1,3,4 *<br>-----                                   | 1-4                              |                                                                   |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | DE 25 18 943 A1 (PLANACORD SA)<br>11 November 1976 (1976-11-11)<br>* claims 10-12; figures 1,2 *<br>-----                                   | 1-4                              |                                                                   |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | DE 20 2005 004400 U1 (REUTER MARTIN [DE])<br>27 July 2006 (2006-07-27)<br>* figure 4 *<br>-----                                             |                                  |                                                                   |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                             |                                  | TECHNICAL FIELDS SEARCHED (IPC)                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                             |                                  | E04B<br>E04C<br>F25D<br>F28D<br>F24F                              |
| Place of search                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                             | Date of completion of the search | Examiner                                                          |
| Munich                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                             | 11 February 2009                 | Khera, Daljit                                                     |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                                                                                                             |                                  |                                                                   |

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 16 3138

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
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11-02-2009

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s)    | Publication<br>date      |
|-------------------------------------------|---------------------|-------------------------------|--------------------------|
| WO 0149372 A                              | 12-07-2001          | AU 2676001 A<br>EP 1214123 A1 | 16-07-2001<br>19-06-2002 |
| GB 1098681 A                              | 10-01-1968          | NONE                          |                          |
| WO 9207150 A                              | 30-04-1992          | AU 8624691 A                  | 20-05-1992               |
| DE 2518943 A1                             | 11-11-1976          | NONE                          |                          |
| DE 202005004400 U1                        | 27-07-2006          | NONE                          |                          |