

(19)



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(11)

EP 0 761 896 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

06.12.2000 Bulletin 2000/49

(51) Int Cl.7: **E04B 1/94**, E04C 2/292

(21) Application number: **96306492.8**

(22) Date of filing: **06.09.1996**

(54) **Fire resistant panel systems**

Systeme feuerwiderstandsfähiger Tafeln

Systèmes de panneaux anti-feu

(84) Designated Contracting States:
BE DE ES FR GB IT NL PT

(30) Priority: **06.09.1995 GB 9518274**

(43) Date of publication of application:
12.03.1997 Bulletin 1997/11

(73) Proprietor: **CAPE DURASTEEL LIMITED**
Wellingborough,
Northamptonshire NN8 4HB (GB)

(72) Inventor: **Ridoutt, William David**
Northampton NN3 3AG (GB)

(74) Representative: **Silverman, Warren et al**
Haseltine Lake & Co.
Imperial House,
15-19 Kingsway
London WC2B 6UD (GB)

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Description

[0001] This invention relates to fire resistant panels.

[0002] As safety requirements in industry increase, ever more sophisticated panel structures meeting ever increasing specifications for use in resisting the advance of fires for specified periods of time have been proposed. Panel structures are thus being proposed which are increasingly expensive. Frequently in the construction industry use is made of steel sheeting and of sandwich structures containing cement material. An example of such a structure is disclosed in WO-A- 93 20300. Technology developed in the construction industry is occasionally extended to meet the requirements of high specification fire resistance.

[0003] It is an object of the present invention to provide a relatively low cost high specification fire resistant panel system which is fire resistant from both sides.

[0004] According to the present invention, there is provided a fire resistant panel structure comprising an opposed pair of fire resistant panels each comprising two metal sheets separated by a filling formed of cement, the panels each having first thicknesses which may be the same or different and, sandwiched between the panels, is a central thermally insulating board having a second thickness greater than either first thickness. In the preferred practice, the two opposed panels will be identical in dimensions and structure.

[0005] In one panel structure embodying the invention, the opposed pair of panels and insulating board are held together by fire-resistant adhesive applied to all mating surfaces.

[0006] A panel structure embodying the invention provides fire resistance by means of the opposed pair of panels and fire and thermal insulation by means of the insulating board. The fire resistant panels will protect the insulating board from direct contact with the fire which would otherwise cause surface erosion of the insulating board and reduce its insulating properties.

[0007] The fire resistant panels may typically be of a cement and steel sheet composite such as that known by the trade mark "Durasteel". Such a composite will offer additional useful properties, such as resistance to impact, moisture, ballistic and criminal attack. The steel element of the composite will form a Faraday Cage which causes attenuation of electromagnetic waves. Such composite boards are readily available and of relatively low-cost. However other fire resistant panels of cement/metal sheet structure as required by the panel structures of this invention may also be used if further specific properties are required.

[0008] The insulating board is preferably a thermally insulating board formed of calcium silicate of low density (260 kg/m² at a thickness of 50 mm) which will enable it to perform its insulating function at high temperatures. Other materials can be used which provide similar properties. Calcium silicate board thicknesses tend to be greater than those of many fire resistant boards and this

is a desirable property where insulating behaviour is required. Typically, fire resistant panels as aforesaid can be manufactured with a thickness of as little as 6 mm overall to be used with calcium silicate insulating board having a thickness of the order of 50 mm.

[0009] When built into an insulating fire barrier system, panel structures embodying the invention can be held together by means of cover strips made from the fire resistant panel material comprised thereby. The cover strips are preferably held in place by screws connecting through to the fire resistant panel of the panel structure. Such structures are self supporting and it is merely necessary for steel angles to be fixed to surrounding masonry and panels to hold to the system in place. The panels may be cut to size to suit the shape of the barrier to be formed and holes cut to accommodate services that need to pass through the barrier. Joints between the panels and masonry may be sealed with fire resistant compositions to prevent passage of fire. Similarly, the services passing through the panel may be sealed with suitable fire stopping material.

[0010] For a better understanding of the invention and to show how the same can be carried into effect, reference will now be made by way of example only, to the accompanying drawings, wherein:-

Figure 1 is a perspective view of a panel structure embodying this invention; and

Figure 2 is a section through a joint between a pair of panel structures embodying the invention.

[0011] Referring to the drawings, Figure 1 shows a pair of fire resistant panels 1 and 2 each made up of a pair of thin steel sheets 3 and 4 between which is sandwiched a body 5 of cementitious material. An insulating panel 6 formed of calcium silicate is adhesively bonded to each such panel by means of a fire resistant adhesive.

[0012] Referring to Figure 2, a pair of panels 1 abut at a joint 7 over which are laid a pair of cover strips 8 secured to each of the panels 1 by screws at positions 9, 10, 11 and 12.

Claims

1. A fire resistant panel structure comprising an opposed pair of fire resistant panels (1,2) each comprising two metal sheets (3,4) separated by a filling (5) formed of cement, the panels each having first thicknesses which may be the same or different and sandwiched between the panels, is a central thermally insulating board (6) having a second thickness greater than either first thickness.
2. A panel structure as claimed in claim 1 wherein the two opposed panels (1,2) are identical in dimensions and structure.

3. A panel structure according to claim 1 or 2, wherein the opposed pair of panels (1,2) and insulating board (6) are held together by fire resistant adhesive applied to all mating surfaces.

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4. A panel structure as claimed in any preceding claim, wherein the insulating board (6) is formed of low density calcium silicate.

5. A panel structure as claimed in claim 4 wherein the opposed panels (1,2) have a thickness of about 6mm and are separated by calcium insulating (6) board having a thickness of about 50mm.

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6. A panel structure as claimed in any preceding claim wherein each panel (1,2) is a cement and steel sheet composite.

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Patentansprüche

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1. Feuerfeste Paneelstruktur, umfassend zwei einander gegenüberliegende feuerfeste Paneele (1, 2), welche jeweils zwei Metallbleche (3, 4) aufweisen, getrennt durch eine Füllung (5) aus Zement, wobei die Paneele jeweils eine erste Stärke besitzen, die gleich oder verschieden sein kann, und zwischen den Paneelen eingeklemmt in der Mitte eine thermisch isolierende Tafel ist, welche eine zweite Stärke besitzt, die über der ersten Stärken liegt.

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2. Paneelstruktur nach Anspruch 1, wobei zwei einander gegenüberliegende Paneele (1, 2) gleiche Größe und gleichen Aufbau besitzen.

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3. Paneelstruktur nach Anspruch 1 oder 2, wobei das einander gegenüberliegende Paneelpaar (1, 2) und die Isoliertafel (6) durch einen feuerfesten Klebstoff, der auf alle zusammentreffende Oberflächen aufgetragen wird, zusammengehalten wird.

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4. Paneelstruktur nach irgendeinem vorhergehenden Anspruch, wobei die Isoliertafel (6) aus niederdichtem Calciumsilikat gebildet ist.

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5. Paneelstruktur nach Anspruch 4, wobei einander gegenüberliegende Paneele (1, 2) eine Stärke von etwa 6 mm besitzen und durch eine etwa 50 mm starke Calcium-Isoliertafel (6) getrennt sind.

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6. Paneelstruktur nach irgendeinem vorhergehenden Anspruch, wobei eine jede Paneele (1, 2) ein Komposit aus Zement und Stahlblech ist.

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Revendications

1. Structure de panneau anti-feu comprenant une pai-

re de panneaux anti-feu opposés (1, 2) comprenant chacun deux feuilles métalliques (3, 4) séparées par une matière de remplissage (5) constituée de ciment, les panneaux ayant chacun des premières épaisseurs qui peuvent être identiques ou différentes, et entre les panneaux, se trouve une planche centrale (6) d'isolation thermique ayant une deuxième épaisseur, plus grande que chacune des premières épaisseurs.

2. Structure de panneau selon la revendication 1, dans laquelle les deux panneaux opposés (1, 2) sont de dimensions et de structure identiques.

3. Structure de panneau selon la revendication 1 ou 2, dans laquelle la paire de panneaux opposés (1, 2) et la planche isolante (6) sont maintenues en cohésion à l'aide d'un adhésif ignifuge appliqué sur toutes les surfaces qui se raccordent.

4. Structure de panneau selon l'une quelconque des revendications précédentes, dans laquelle la planche isolante (6) est constituée de silicate de calcium à basse densité.

5. Structure de panneau selon la revendication 4, dans laquelle les panneaux opposés (1, 2) ont une épaisseur d'environ 6 mm et sont séparés par une planche isolante (6) au calcium ayant une épaisseur d'environ 50 mm.

6. Structure de panneau selon l'une quelconque des revendications précédentes, dans laquelle chaque panneau (1, 2) est un panneau composite ciment/feuilles d'acier.

