(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 0 878 980 B2**

(12) **NEW EUROPEAN PATENT SPECIFICATION**
After opposition procedure

(45) Date of publication and mention of the opposition decision:
10.09.2014 Bulletin 2014/37

(45) Mention of the grant of the patent:
02.02.2005 Bulletin 2005/05

(21) Application number: **97500191.8**

(22) Date of filing: **11.11.1997**

(51) Int Cl.:
H05B 3/26 *(2006.01)* ***H05B 3/28*** *(2006.01)*

(54) Process to manufacture heating panels

Herstellungsverfahren für Flachenheizkörper

Procédé de fabrication de panneaux chauffants

(84) Designated Contracting States:
AT BE CH DE DK FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV RO SI

(30) Priority: **09.05.1997 ES 9701282**
12.08.1997 ES 9701785

(43) Date of publication of application:
18.11.1998 Bulletin 1998/47

(73) Proprietor: **Sanchez Duque, David**
10005 Caceres (ES)

(72) Inventor: **Sanchez Duque,David**
10005 Caceres (ES)

(74) Representative: **De la Fuente Fernandez, Dionisio**
Invicta Patents and Trade Marks, S.L.
Plaza de Castilla, 3 Bis Local
28046 Madrid (ES)

(56) References cited:
FR-A- 2 484 180
FR-A- 2 582 387
GB-A- 1 079 902
GB-A- 1 354 703
US-A- 3 973 103
US-A- 5 391 861

EP 0 878 980 B2

Description

OBJECT OF THE INVENTION

[0001] This invention refers to a manufacturé process for heating panels.

[0002] More specifically, the invention develops a process to obtain a heating panel from a board based on an insulating and fireproof material, over which a series of components are applied, such as various strips of a conducting material, an insulating material such as glass fiber over the former for its protection and electrical insulation and one or more electroconducting paint films, heat generator, applied throughout prviously determined areas or sectors of the board. A second optional board, equal to the first, applied over the mentioned components, determines the formation of a heating panel constructed in a sandwich form.

[0003] The field of application of this invention obviously includes the industry dedicated to the manufacture of heating components and, especially, heating panels.

BACKGROUND AND SUMMARY OF THE INVENTION

[0004] In the current state of the art, the fact of using in certain applications electroconducting paint to induce the heating of an object, room, etc. in which it is applied is known. At present, the existence of patent number 8602344 is known, in which a heating system by means of an electroconducting coating is described, by means of which the necessity of heating a certain space is solved and for this purpose an electroconducting paint coating is applied directly over the walls, ceiling, etc. of the space to be heated and afterwards, two cables are fitted to the ends of the coated area and in contact with the electroconducting coating, across which a supply voltage is applied to said coating, inducing the emission of heat by means of the transformation of the supplied electric energy into heating energy.

[0005] This system, although it may satisfy the purpose for which it has been developed, is not free from disadvantages, like, for example, the fact of applying directly the paint to the walls, with the resulting investment of time and manpower or even the care that should be placed in the application of said coating to maintain the best and most uniform resistance possible.

[0006] Therefore, there is a need to provide some other component, whose installation is easier and which in turn is more flexible and versatile regarding the possibilities of use.

[0007] U.S. Patent No. 5.391.861 describes a heater comprising an electrically insulating board in which two transversally separate electrically conducting strips have been incorporated and connected by means of plurality of longitudinally separated resistors, these constituting the generating heat elements when they are electrically fed.

[0008] British Patent No. GB-1 354 703 describes a method and device for producing of electrically conducting coatings intended for to provide a coating on a wall by using an electrically conducting coating material expended between electrodes attached to the wall.

[0009] French Patent No. FR-2 484 180 describe a radiating heating device which includes an active surface in a radiant panel, whose active surface has been arranged in a sandwich manner between a reflecting layer formed by the forward face of a rear panel and a radiant frontal panel, said active surface being obtained by means of a homogeneous layer formed with a material deposited in flowing state, as a painting manner.

[0010] This invention proposes the development of a process for constructing a heating panel that may be executed simply and rapidly, and by means of which, as the end product, a panel is obtained, which is light, manageable, of reasonable cost and especially guarantees the user an electrical insulation permitting its handling, installation and operation without any risk of electric discharge.

[0011] Accordingly, the above-cited aims are met by providing a process for manufacturing heating panels as described in claim 1.

[0012] The characteristics distinguishing said process basically consist of the arrangement of a base board made of an insulating material like, for example, micanite, in a further layer a coating that is a good electricity conductor, for example, one based on copper, forming longitudinal strips, after which in the following stage a coating material is applied to protect and insulate said strips, of an insulating material, like, for example, one based on glass fiber or a similar material, applying it at least over the areas surrounding the mentioned conducting strips; then, in the following stage, an electroconducting paint is applied on different previously determined surface areas and on the strips of conducting material and the areas of insulating material covering the former, in electrical contact with the conducting strips; the last stage of panel construction consists of the arrangement of a second base board of insulating and fireproof material, preferably of the same material as the former, attached to its face over which the coatings have been made, which it hides or houses sandwichwise, to protect them against any manipulation or external agent.

[0013] The obtained panel therefore has some sectors coated with electroconducting paint, transmitters of heat when an electric current is made circulate through the same, due to the characteristic of electrical resistance of said paint, joined near the end of the respective conducting strips (of copper), through which a supply voltage of a predetermined level is applied, preferably from the mains, said sectors advantageously consisting of superficial parts, generally rectangular, arranged parallel to each other, separated by a certain distance and distributed preferably uniformly throughout the surface of the base board. The supply strips will be arranged as demanded by the type of connection to be established between following sectors of electroconducting material,

that is, due to the fact that according to the invention the mentioned sectors may be electrically connected to each other in series, each one of the strips will consecutively be connected to the alternate ends of each two consecutive sectors in the second case.

[0014] Preferably, the supply of each panel will be executed at a voltage of 220 V, so that the heat generating paint sectors will be calculated to support said voltage.

[0015] Once the second micanite (or other non-conducting fireproof material) board has been installed over the first, only those openings necessary to execute the electric connections corresponding to the electricity mains will be visible. The panel obtained in this way may be installed directly over any surface to be heated, without having to carry out any works or conditioning of said surface.

[0016] In a more simple variation of the invention, the perfected heating panel is constructed from a substrate, generally micanite or any other type of fireproof material, which does not conduct electricity, over which an electroconducting paint is applied over a predetermined area, specifically covering the pre-delimited areas of the substrate.

[0017] By means of some strips, made of copper or any other suitable material, the areas coated with the electroconducting paint are interconnected and the ends of said strips are used as connection points to the mains.

[0018] Optionally, thermostats and adjustment components may be incorporated, so that once the temperature predetermined by the user has been reached, the passage of energy to the electroconducting areas is stopped and the latter, on not receiving energy, cut their action. The external areas of the substrate are provided with a suitable coating, such as fine strips or panels of wood or similar, or another material permitting the extrapolation of the heat generated towards the exterior.

[0019] Evidently, the conducting strips manufactured with copper will be duly insulated and protected by means of a glass or mineral wool coating, it being possible to use the insulating materials considered best for the application in question.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The following detailed description for the purpose of the invention refers to the attached drawings, which as an example and without a limiting character whatsoever, represent a preferable form of embodiment. In said drawings:

Figure 1 shows a schematic view of a heating panel, and

Figure 2 shows an embodiment for a panel in accordance with the present invention.

DESCRIPTION OF THE PREFERRED EMDODIMENT

[0021] In figure 1 a board 1, represented in a schematic way, supports on one of its sides the different coatings incorporated to obtain the final panel.

[0022] The process has foreseen the preparation of a base board 1, manufactured in a suitable insulating and fireproof material, such as micanite or any other of similar characteristics, as has been mentioned previously, on which areas are selected for the application of an electricity conducting material in the following stage, like, for example, copper, forming the strips 4, 5, to conduct electricity when connected to a power source, such as the electricity mains, and then being applied a coating of suitable insulating material, such as, for example, glass fiber, covering said strips and extended to areas 2,3 which widely surround the mentioned electricity conductor strips 4,5. The following stage consists of the formation of a predetermined number of sectors 6, using an electroconducting paint, capable of generating heat due to its resistance when a current of electricity is passed through it, and in a way that the parts corresponding to the end edges of said sectors lean on (and also are in electric contact with) the mentioned electricity conducting strips 4,5.

[0023] According to the preferable representation of figure 1, both areas 2,3 of glass fiber and the conducting strips 4,5 have been arranged near the larger sides of a base board 1, which has a rectangular shape, parallel to said edges. The sectors 6 of heat generating electroconducting paint are arranged in the transverse direction of board 1, parallel to each other, and separated by a certain distance. As can be seen, sectors 6 receive electricity supply in parallel from the copper strips 4,5, that is, the ends of a same side receive supply from the corresponding strip 4 and the ends of the opposite side receive it from strip 5, once both strips are connected to the electricity supply, preferably to the electricity mains. The second board (not represented), of the same fireproof material as the first, once connected to the described assembly, hides all the conducting and heat generating parts, so that the assembly may be handled completely normally and fitted on the surface to which it is desired to transmit the generated heat.

[0024] Referring now to figure 2, the representation of an execution of the panel following the invention can be observed, which as a whole has a simplified geometry and finish as compared with the panel of figure 1. In fact, to achieve this heating panel, the base is a substrate 1 of micanite or any other suitable material such as ceramic or any fireproof and non-electricity conducting material, a coating of electroconducting paint, forming determined areas 7, which are interconnected by copper strips 8, duly insulated with an appropriate material 9, obtaining that the copper strips 8 generate the communication of the areas 7 coated with electroconducting paint obtaining as a result of the connection of the strips 8, to the mains, by means of the connections 10 with or without the col-

laboration of a thermostat or suitable adjuster, that the paint acts as a resistance generating heat towards the exterior, and finally the two faces of the substrate 1 being externally covered with wooden panels or strips, which decorate the perfected heating panel 1 allowing its suitable attachment on a surface, it likewise being possible to omit the incorporation on one of the external wooden panel faces, only covering the seen face, permitting the incorporation of one or several panel units in a house, industrial premises, cattle or farming installations, evidently generating a heat which reaches a predetermined temperature according to the required application.

[0025] As will be appreciated, in the case of the simplified execution of figure 2, the covered areas 7 are connected in series by means of the conducting strips 8.

[0026] It is not considered necessary to extend the contents of this description further for an expert in the matter to understand its limits and advantages derived from the invention, as well as to develop and perform the purpose thereof.

Claims

1. A process for manufacturing heating panels able to be installed on any surface to be desirably heated, comprising the following process steps:

   preparing a first base board (1), or substrate of a fireproof insulating material, preferably micanite, ceramic or similar;
   applying to said first base board (1) a coating layer of an electricity conducting material, for example copper, forming at least two longitudinal strips (8);
   applying over the areas surrounding said longitudinal strips (8) a coating of insulating material (9), for example glass fiber, and
   applying over selected areas a coating layer of heat generating electroconducting paint forming sectors (7) in such a way that they are in electrical contact with said longitudinal strips (8);
   characterized in that,
   said longitudinal strips (8) and said sectors (7) are applied in such a way that the sectors (7) are connected with each other in series; and **in that**,
   a second base board of a fireproof insulating material is attached to the face of said firs base board (1) over which the coatings have been made, and hiding them sandwichwise.

2. A process according to claim 1, wherein strips of insulating material are applied to said second base board for their superimposition on said longitudinal strips (8) coated on said first base board (1).

Patentansprüche

1. Ein Verfahren zur Herstellung von Erwärmungsplatten, die auf einer beliebigen zu erwärmenden Oberfläche installiert werden können. Es umfasst folgende Fertigungsphasen:

   Vorbereitung einer ersten Grundplatte (1) oder Grundschicht aus einem feuerfesten Isoliermaterial, vorzugsweise Mikanit, Keramik o. ä.;
   Anbringung auf diese Grundplatte (1) einer Beschichtung aus elektrisch leitfähigem Material, z. B. Kupfer, die mindestens aus zwei länglichen Bändern (8) besteht;
   Anbringung auf die Bereiche, die diese länglichen Bänder (8) umgeben, einer Schicht Isoliermaterial (9), z. B. Glasfaser, und
   Anbringung auf die ausgewählten Bereiche einer Beschichtung mit elektrisch leitender und wärmeerzeugender Farbe wobei Segmente (7) gebildet werden, so dass sie elektrischen Kontakt mit den erwähnten länglichen Bändern (8) haben;
   gekennzeichnet dadurch, dass
   die genannten länglichen Bänder (8) und die genannten Segmente (7) so aufgebracht werden, dass die Segmente (7) in Reihe miteinander verbunden werden; und dadurch, dass
   eine zweite Grundplatte aus einem feuerfesten Isoliermaterial auf der Oberseite der genannten Grundplatte (1), auf die die Beschichtungen-aufgetragen wurden, angebracht wird und diese in Sandwichform verdeckt werden.

2. Ein Verfahren gemäß Anspruch 1, in dem die Bänder aus Isoliermaterial auf der erwähnten zweiten Grundplatte angebracht werden, um die erwähnten beschichteten länglichen Bänder (8) auf der erwähnten ersten Grundplatte (1) zu überdecken.

Revendications

1. L'un des processus à suivre pour la fabrication de panneaux chauffants pouvant être installés sur n'importe quelle surface que l'on souhaite chauffer, comprend les phases suivantes :

   préparation d'une première plaque de base (1) ou substrat avec un matériau isolant ignifuge, de préférence de la micanite, céramique ou équivalent ;
   application sur la première plaque de base (1) d'une couche de revêtement avec un matériau conducteur de l'électricité, du cuivre par exemple, en formant au moins deux bandes longitudinales (8) ;
   application sur les zones autour de ces bandes

longitudinales (8) avec une couche de matériau isolant (9), de la fibre de verre par exemple, et application sur les zones choisies d'une couche de revêtement avec une peinture électro-conductrice générant de la chaleur tout en formant des secteurs (7), de façon à ce qu'ils soient en contact électrique avec ces bandes longitudinales (8) ;
caractérisé parce que,
ces bandes longitudinales (8) et ces secteurs (7) sont appliqués de façon à ce que les secteurs (7) demeurent reliés avec les autres en série ; et parce que,
une deuxième plaque de base revêtue avec un matériau isolant ignifuge est fixée sur la face de la première plaque de base (1) sur laquelle l'on aura appliqué les couches de revêtement, en les cachant en forme de « croque-monsieur ».

2. Un processus selon la revendication 1, dans laquelle les bandes de matériau isolant sont appliquées sur cette deuxième plaque de base pour la superposer sur ces bandes longitudinales (8) recouvrant la première plaque de base (1).

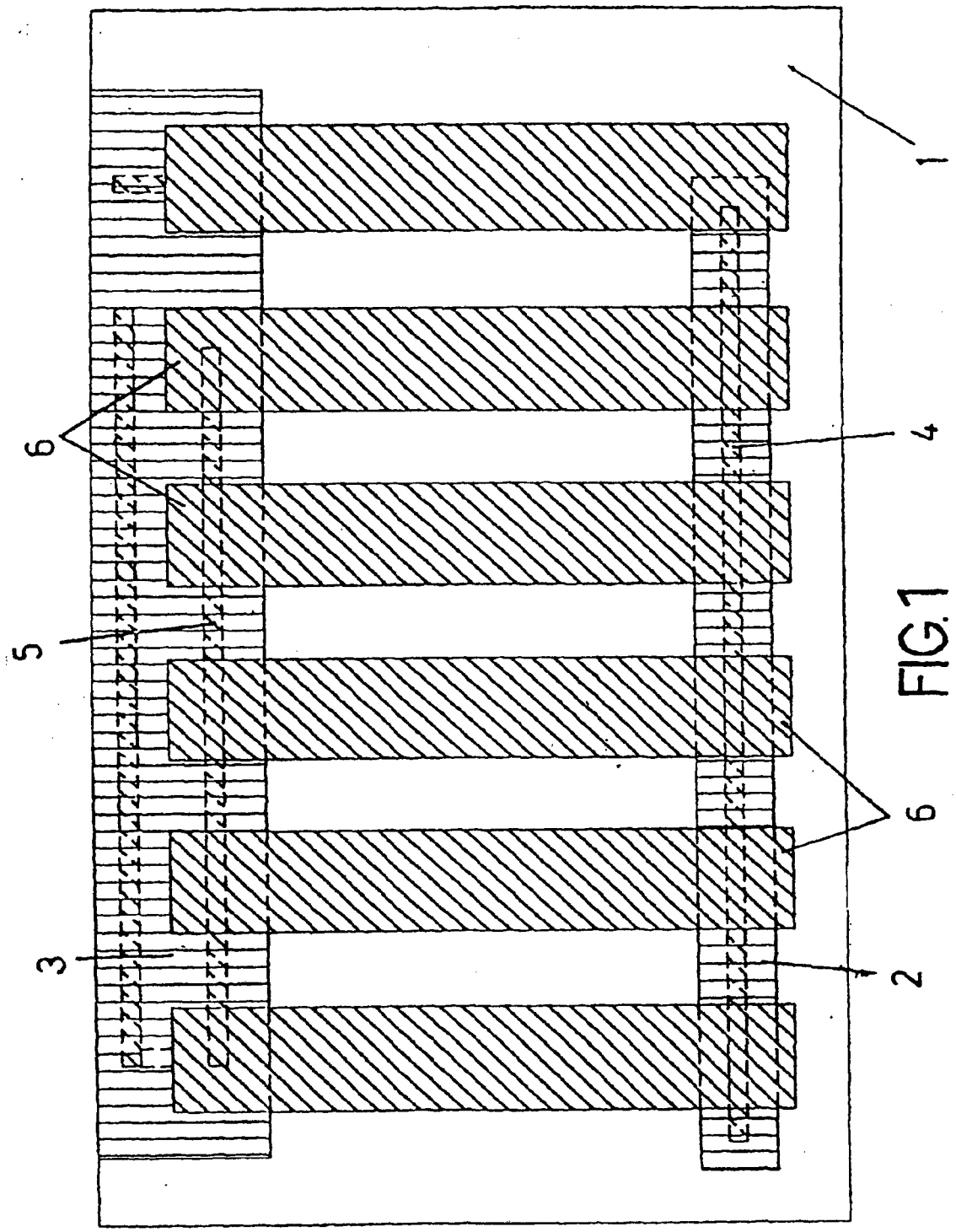


FIG.1

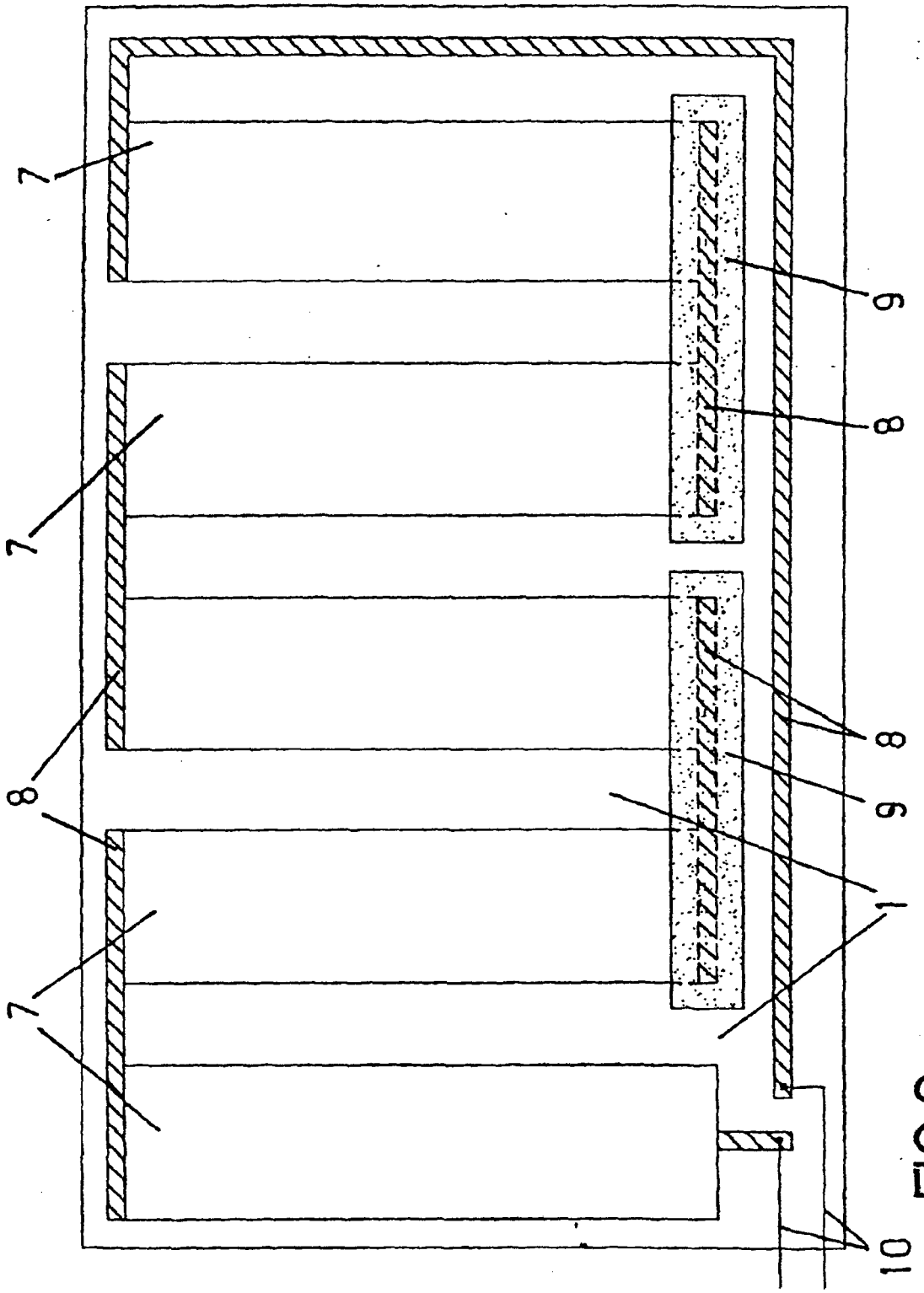


FIG.2

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 8602344 A **[0004]**
- US 5391861 A **[0007]**
- GB 1354703 A **[0008]**
- FR 2484180 **[0009]**