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

(11) EP 0 878 980 A2

(12) EUROPEAN PATENT APPLICATION

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

(51) Int. Cl.[6]: **H05B 3/26**

(21) Application number: **97500191.8**

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

(84) Designated Contracting States:
AT BE CH DE DK ES 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

(71) Applicant: **Sanchez Duque, David**
10005 Caceres (ES)

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

(74) Representative:
De la Fuente Fernandez, Dionisio
Bufete de la Fuente, S.L.,
c/ José Lazaro Galdiano, 1,
1.o dcha.,
Escalera A
28036 Madrid (ES)

(54) Process to manufacture heating panels and panels obtained therefrom

(57) A process for the manufacture of heating panels, consisting of the formation, on a flat base of insulating material, preferably micanite, ceramic or similar, of two or more conducting strips for electricity supply, for example copper, on which an insulating material is applied, preferably glass fiber, extended to the respective areas surrounding said conducting strips, after which a heat generating electroconducting paint is applied, distributed according to the sectors extended between opposite conducting strips and in contact with them. Said sectors are uniformly distributed throughout the panel surface, separated by a certain distance, connected in series or in parallel by means of said conducting strips, and over the assembly a second insulating panel with the same characteristics as the first, or optionally a strip of wood or other insulating material is fitted.

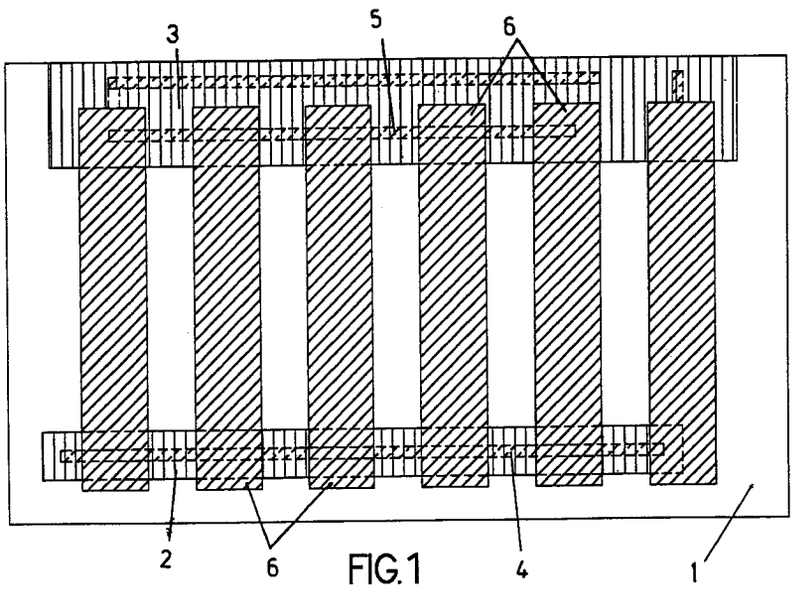

FIG.1

EP 0 878 980 A2

Description

OBJECT OF THE INVENTION

This invention refers to a manufacture process for heating panels, as well as the panels obtained from the implementation of said process, contributing basic novel characteristics and important advantages compared with systems known and used in the correct state of the art.

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.

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

In the current state of the art, the fact of using in certain applications electroconductive 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.

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.

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.

This invention proposes as the main purpose 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.

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.

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 the mentioned sectors may be electrically connected to each other in parallel or in series, each one of the strips will consecutively be connected to the ends of a same side of each sector mentioned in the former case, or the alternate ends of each two consecutive sectors in the second case.

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, although if it is preferred to connect them in series, they will be grouped in five units at a time for each series, so that each sector supports a voltage of about 48 V, and whose characteristics will he adapted to this voltage level.

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.

In a more simple variation of the invention, the perfected heating panel, purpose of the invention, 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.

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.

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.

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

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 obtained according to the process of this invention, and

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

DESCRIPTION OF THE PREFERRED EMBODIMENT

The detailed description of the preferred embodiment of the process of this invention and the resulting heating panel will refer to the attached figure 1, in which a board 1, represented in a schematic way, supports on one of its sides the different coatings incorporated to obtain the final panel.

The process of the invention has foreseen the preparation of a base board 1, manufactured in a suitable insulating arid 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.

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.

Referring now to figure 2, the representation of an alternative 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 anti 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 collaboration 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.

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. Of course, this form of execution is merely an illustration, since the electric connection between the areas 7 may likewise be carried out in parallel, without the latter changing any of the basic characteristics of the panel.

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.

Nevertheless, it should be understood that the invention has been described according to a preferable execution thereof, so that it may be susceptible of modifications without this meaning any change whatsoever of the bases of said invention, said modifications being possible to concern the particular shape, size and/or manufacturing materials.

Claims

1. A process to manufacture heating panels, able to be installed on any surface to be desirably heated, characterized in that it includes:

   preparing a base board (1), or substrate, of a fireproof insulating material, preferably micanite, ceramic or similar, with the appropriate dimensions and shape;
   superimposing at least two strips (4, 5, 8) of an electricity conducting material, for example copper, extended as longitudinal portions of the base board or substrate (1) of a predetermined size;
   covering the surrounding areas (2,3,9) of the mentioned strips (4, 5, 8) with an insulating material, such as, for example, glass fiber;
   applying a heat generating electroconducting paint layer over the mentioned board, over the previous arrangement, distributed in sectors (6, 7) of a predetermined size and positioning, and arranging a second panel of the same characteristics and of a material identical to the first panel (1), superimposed on the assembly formed in previous stages, so that said assembly is housed between both panels in a manner similar to a sandwich, or alternatively using strips of an insulating material for its superimposition on the mentioned conducting strips.

2. A heating panel obtained according to the process of claim 1, to generate heat, which is able to be physically fitted on any surface to be heated, characterized in that it consists of a base board (1) or substrate, preferably of a rectangular shape, on which there are conducting strips (4, 5, 8) in positions that are parallel to both larger sides of the panel and located near to both sides that are parallel to the same, moreover having the transverse sectors (6, 7), in a predetermined number, of appropriate dimensions, uniformly distributed throughout the panel surface, maintaining a separation between each other, made of an electroconducting paint that due to its resistance characteristics is heat generating, and in a way that the ends of each of the mentioned sectors (6) are in electric contact with the respective strips (4, 5, 8) of the same side.

3. A panel according to claim 2, characterized in that the strips (4,5) are arranged in such a way that said sectors (6,7) of electroconducting paint may be connected to each other optionally in parallel or in series.

4. A panel according to claims 2 and 3, characterized in that the heat generation by the sectors (6,7) with electroconducting paint is produced when they are electrically supplied, preferably from the mains, and preferably with the inclusion of adjustment and control components, such as thermostats or others.

5. A panel according to any of the previous claims 2 to 4, characterized in that a second panel with characteristics equal to the first base panel (1), is superimposed on the entire assembly, protecting the different components which are housed sandwichwise, providing the pertinent electrical insulation and permitting an easy and beneficial handling.

6. A panel according to any of the claims 1 to 4, characterized in that optionally the panel may be covered, on one or both faces, with a strip of wood or any nonconducting material.

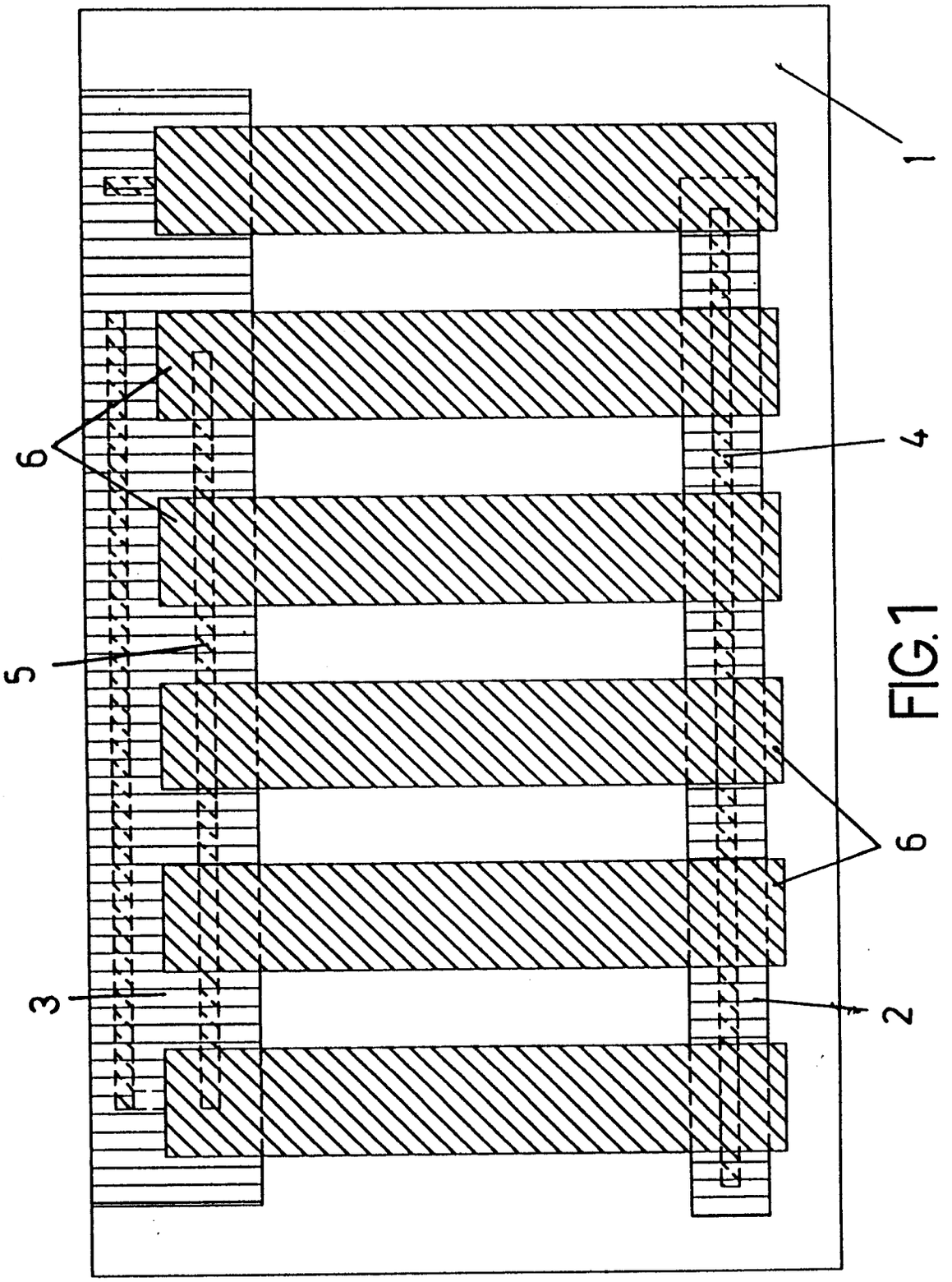

FIG.1

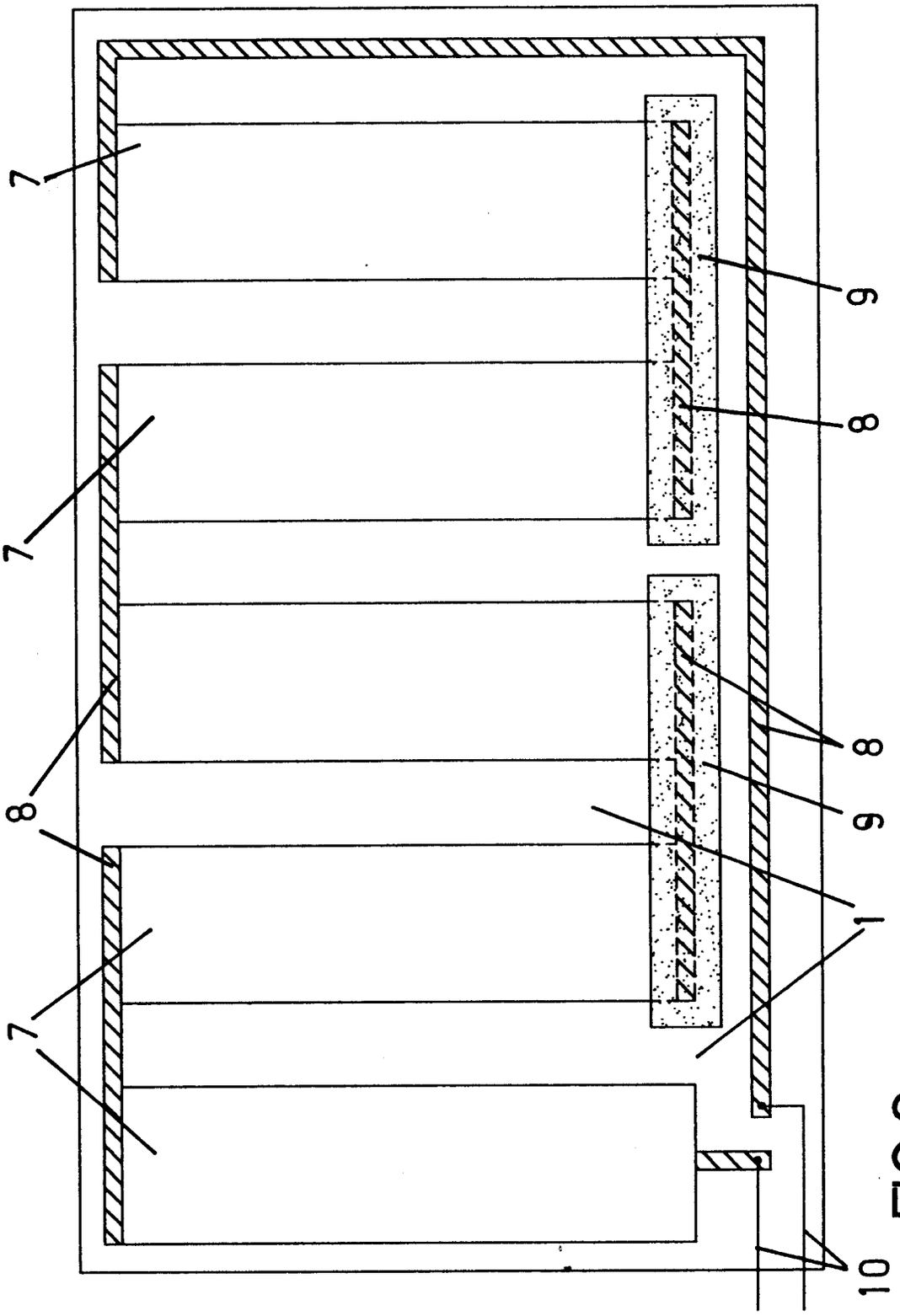

FIG.2