



(11) **EP 2 141 418 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
06.01.2010 Bulletin 2010/01

(51) Int Cl.:
F24D 19/06 ^(2006.01) **F24H 3/00** ^(2006.01)
F24H 7/02 ^(2006.01)

(21) Application number: **08380198.5**

(22) Date of filing: **04.07.2008**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT
RO SE SI SK TR**
Designated Extension States:
AL BA MK RS

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(54) **Electric heating system**

(57) The invention relates to an electric heating system (2) which, using any heat generating source (8), combines a porcelain stoneware accumulating and radiating element (4) forming the front part of the equipment with a V0 carbon polymer rear part or casing (6), together forming a unit which completely insulates from the passage of electric current and completely ensuring the

physical impossibility of an electric discharge to the user. The electric heating system further allows incorporating programming and control technologies based on radio frequency communication systems between the equipment, because neither the porcelain stoneware nor the V0 polymers interfere in the passage of radio waves.

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Description

Technical Field of the Invention

[0001] The present invention is comprised within the technical field of electric heating systems and more specifically, electric heating systems with an accumulating and radiating element.

Background and State of the Art

[0002] Many traditional heating systems have a very pronounced aesthetic aging (oxidation, discoloration, dirt accumulation, marks of blows and scratches). In addition, the radiators and convectors of said traditional systems have little or no heat accumulation capacity, whereby a lack of comfort is observed due to the sudden temperature decreases after the disconnection.

[0003] One type of heating, which does not experience the previous problems, is the so-called mixed heating. Unlike other conventional heating systems, mixed heating combines convection, irradiation and accumulation in a single piece of equipment/system. The system has a special electric resistance located at the inner part and a grate through which air enters. In contact with the resistance, the air is heated and starts moving due to the effect of convection, transferring its heat to the space to be heated and to an accumulating and radiating element. At the same time as the room reaches the comfort temperature, the accumulating element acquires its maximum temperature and during this process it is transferring heat to the environment due to the effect of irradiation.

[0004] To improve mixed heating systems even more, the use of porcelain stoneware for the accumulating and radiating element was proposed, as is disclosed in the Spanish utility model ES 1 042 460 U. The use of porcelain stoneware for the accumulating and radiating element is very advantageous because this material has a water absorption of less than 0.06%, whereby a very good frost and stain resistance is achieved. Furthermore, it has a high impact resistance, a very good scratch resistance (grade 6 in the Mohs scale), its colors are unalterable against attacks from light and is unalterable against chemical attacks. These values confer unique characteristics to the porcelain stoneware accumulating and radiating element as regards its duration and preservation.

[0005] Furthermore, as a result of the porcelain stoneware accumulator and radiator, temperature peaks are prevented, achieving greater comfort and savings. An additional differentiating element is the wide variety of colors and finishes which the porcelain stoneware allows incorporating to the equipment without losing the previously described properties, which is an unprecedented achievement in the heating market.

[0006] Known mixed heating systems have a metal rear casing (frame). However, the external metal com-

ponents can undergo a possible electric derivation, with the subsequent risk for the user since the metal conducts electric current. In addition, the use of metal envelopments or casing prevents the correct diffusion of radio waves, making it difficult to use radio frequency communication and control systems in these equipments.

Summary of the Invention

[0007] For the purpose of solving the aforementioned technical problem, the present invention provides, in a first aspect, an electric heating system comprising a heat generating source, a porcelain stoneware accumulating and radiating element, receiving the heat generated by the generating source and a casing formed at least partially by a V0 carbon polymer. The term V0 corresponds to a classification assigned to materials depending on their degree of inflammability, according to the American standard UL 94. An advantage of using V0 polymers is that they are fire-resistant and flameproof.

[0008] The present invention provides, in a second aspect, a casing formed at least partially by V0 carbon polymer for the use in an electric heating system comprising, in addition to the casing, a heat generating source and a porcelain stoneware accumulating and radiating element, which receives the heat generated by the generating source.

[0009] These and other objects of the invention are achieved by means of an electric heating system according to independent claim 1 and a casing according to independent claim 9. Advantageous embodiments are defined by means of the dependent claims.

[0010] The porcelain stoneware accumulating element and the V0 carbon polymer casing together form a unit which completely insulates from the passage of electric current, completely ensuring the physical impossibility of an electric discharge to the user. It further allows incorporating programming and control technologies based on radio frequency communication systems between several pieces of equipment, because neither the porcelain stoneware nor the carbon polymers interfere in the passage of radio waves.

[0011] Furthermore, the manufacture of the rear casing in polymers allows including other very useful elements in the heating system, which cannot be easily implemented with the metal casing of the systems of the state of the art.

[0012] Thus, according to an advantageous embodiment, longitudinal reliefs, preferably in a vertical direction, and circular reliefs in a matrix arrangement, which minimize vibrations and therefore noise, are included in the inner part of the casing.

[0013] According to another advantageous form, the casing comprises one or more holes for anchoring/fixing the system and, on its outer face, one or more guides in relief to facilitate the mentioned anchoring/fixing to the corresponding wall. The quick and comfortable anchoring of the heating system is thus facilitated.

[0014] According to yet another embodiment, the casing comprises in its inner part one or more reliefs surrounding the anchoring holes, thus preventing or minimizing convection leakages and the subsequent stains on the wall.

[0015] Furthermore, at least some of the different modules forming the air outlet grate in the casing can have an arrow tip-shaped section, i.e., thinner on the inner face and thicker on the outer face, such that a laminar and non-turbulent air flow is achieved in the convection, preventing stains on the wall.

[0016] According to yet another advantageous embodiment, the upper geometry of the casing is in the form of a concave moulded grate minimizing the surface, decreasing the heat sensation upon contact with the skin.

Brief Description of the Drawings

[0017] To complement the description which is being made and for the purpose of aiding to better understand the features of the invention according to an example of a preferred and practical embodiment thereof, a set of drawings is attached as an integral part of said description, in which the following has been shown with an illustrative and non-limiting character:

Figure 1 shows a perspective view of the front part of the electric heating system object of the invention. Figure 2 shows an exploded view of the most important constituent parts of the heating system according to the invention shown in Figure 1.

Figure 3 shows a side view of the electric heating system object of the invention.

Figure 4 shows a rear view of the electric heating system object of the invention.

Figure 5 shows a top view of the electric heating system which is the object of the invention.

Figure 6 shows a detailed view of the outer part of the casing of the electric heating system object of the invention.

Figure 7 shows a detailed view of the inner part of the casing of the electric heating system object of the invention.

Figure 8 shows a detailed view of the air outlet grate of the electric heating system object of the invention.

Description of a Preferred Embodiment

[0018] As has been indicated above, the detailed description of the invention will be made taking into consideration the representations of the attached drawings, through which the same reference numbers are used to designate identical or similar parts.

[0019] In this sense, an example of the electric heating system 2 of the invention can be observed in Figures 1-5. Said system comprises a porcelain stoneware accumulating and radiating element 4 forming the front part of the equipment and a rear part or casing 6 which is formed

by V0 carbon polymers with fiberglass finished in high-strength silver. The system has a heat generating source 8, for example in the form of an electric resistance located in the inner part, and an air inlet grate 10 through which air enters. In contact with the resistance, the air is heated and starts moving due to the effect of convection, transferring its heat to the accumulating and radiating element 4 and, after exiting through an air outlet grate 12, also transferring its heat to the space to be heated. At the same time as the room reaches the comfort temperature, the accumulating element acquires its maximum temperature and during this process it transfers heat to the environment due to the effect of irradiation.

[0020] The inner temperature is controlled by means of a control thermostat (not shown in the figures). When the thermostat detects that the room is at the suitable temperature, the system stops consuming energy and continues transferring the heat accumulated in the accumulating element, using the high thermal inertia of the latter.

[0021] The porcelain stoneware accumulating element and the carbon polymer casing together form a unit which completely insulates from the passage of electric current, completely ensuring the physical impossibility of an electric discharge to the user. It further allows incorporating programming and control technologies based on radio frequency communication systems between several pieces of equipment, because neither the porcelain stoneware nor the carbon polymers interfere in the passage of radio waves. For example, the system can have a radio receiving unit therein and one or more loudspeakers 26 for the playback of the sound received through the radio receiving unit.

[0022] To facilitate a quick installation of the heating system and prevent any accidental disassembly, the casing 6 is provided with one or more anchoring holes 14 and, on its outer face, with one or more orienting anchoring guides in relief 16, as shown in Figure 6. The holes 14 are protected in the inner part of the casing with a relief 18, as shown in Figure 7, which relief prevents or minimizes convection leakages through the holes 14, making the laminar air flow rising from the lower part collide with the relief and go around the holes 14, thus preventing hot air from exiting and the subsequent problem of stains on the wall.

[0023] Figure 7 also shows the inclusion in the inner part of the casing 6 of longitudinal reliefs 20 in a vertical direction and circular reliefs 22 in a matrix arrangement which minimize vibrations and therefore noise.

[0024] To reduce turbulences and prevent stains on the wall, the air outlet grate 12 is an aerodynamic convection grate with a rear deflector and an arrow tip-shaped inner grate, i.e., thinner on the inner face and thicker on the outer face.

[0025] The upper geometry of the casing is in the form of a concave moulded grate 24, as shown in Figure 8, minimizing the surface, decreasing the heat sensation upon contact with the skin.

Claims

1. An electric heating system (2) comprising a heat generating source (8), a porcelain stoneware accumulating and radiating element (4) receiving the heat generated by the generating source (8), and a casing (6), **characterized in that** the casing (6) is formed at least partially by V0 carbon polymers. 5
2. The system according to claim 1, **characterized in that** the inner part of the casing (6) comprises longitudinal reliefs (20) and circular reliefs (22) which minimize vibrations and therefore noise. 10
3. The system according to any of claims 1 or 2, **characterized in that** the casing (6) comprises one or more anchoring holes (14) for anchoring the system and, on its outer face, one or more orienting anchoring guides in relief (16). 15
4. The system according to claim 3, **characterized in that** the casing (6) comprises in its inner part one or more reliefs (18) surrounding the anchoring holes (14), thus preventing or minimizing convection leakages. 20
5. The system according to any of claims 1-4, **characterized in that** it comprises an air inlet grate (10) for convection heating and an air outlet grate (12), in which at least some of the different modules forming the air outlet grate (12) have an arrow tip-shaped section, i.e., thinner on the inner face and thicker on the outer face, such that a laminar and non-turbulent air flow is achieved in the convection. 25
6. The system according to any of claims 1-5, **characterized in that** the air outlet grate (12) is moulded and has a concave shape (24), thus minimizing the surface and decreasing the heat sensation upon contact with the skin. 30
7. The system according to any of claims 1-6, **characterized in that** the system internally comprises programming and/or control means based on radio frequency communication. 35
8. The system according to any of claims 1-7, **characterized in that** the accumulating and radiating element (4) forms the front part of the system and the casing (6) forms the rear part. 40
9. A casing for use in electric heating systems, **characterized in that** it is formed at least partially by V0 carbon polymers. 45
10. The casing according to claim 9, **characterized in that** the inner part comprises longitudinal reliefs (20) and circular reliefs (22) which minimize vibrations 50
11. The casing according to any of claims 9 or 10, **characterized in that** it comprises one or more anchoring holes (14) for a heating system and, on its outer face, one or more orienting anchoring guides in relief (16). 55
12. The casing according to claim 11, **characterized in that** it comprises in its inner part one or more reliefs (18) surrounding the anchoring holes (14), thus preventing or minimizing convection leakages.
13. The casing according to any of claims 9-12, **characterized in that** it comprises an air inlet grate (10) for convection heating and an air outlet grate (12), in which at least some of the different modules forming the air outlet grate (12) have an arrow tip-shaped section, i.e., thinner on the inner face and thicker on the outer face, such that a laminar and non-turbulent air flow is achieved in the convection.
14. The casing according to any of claims 9-13, **characterized in that** the air outlet grate (12) is moulded and has a concave shape (24), thus minimizing the surface and decreasing the heat sensation upon contact with the skin.

and therefore noise.

2

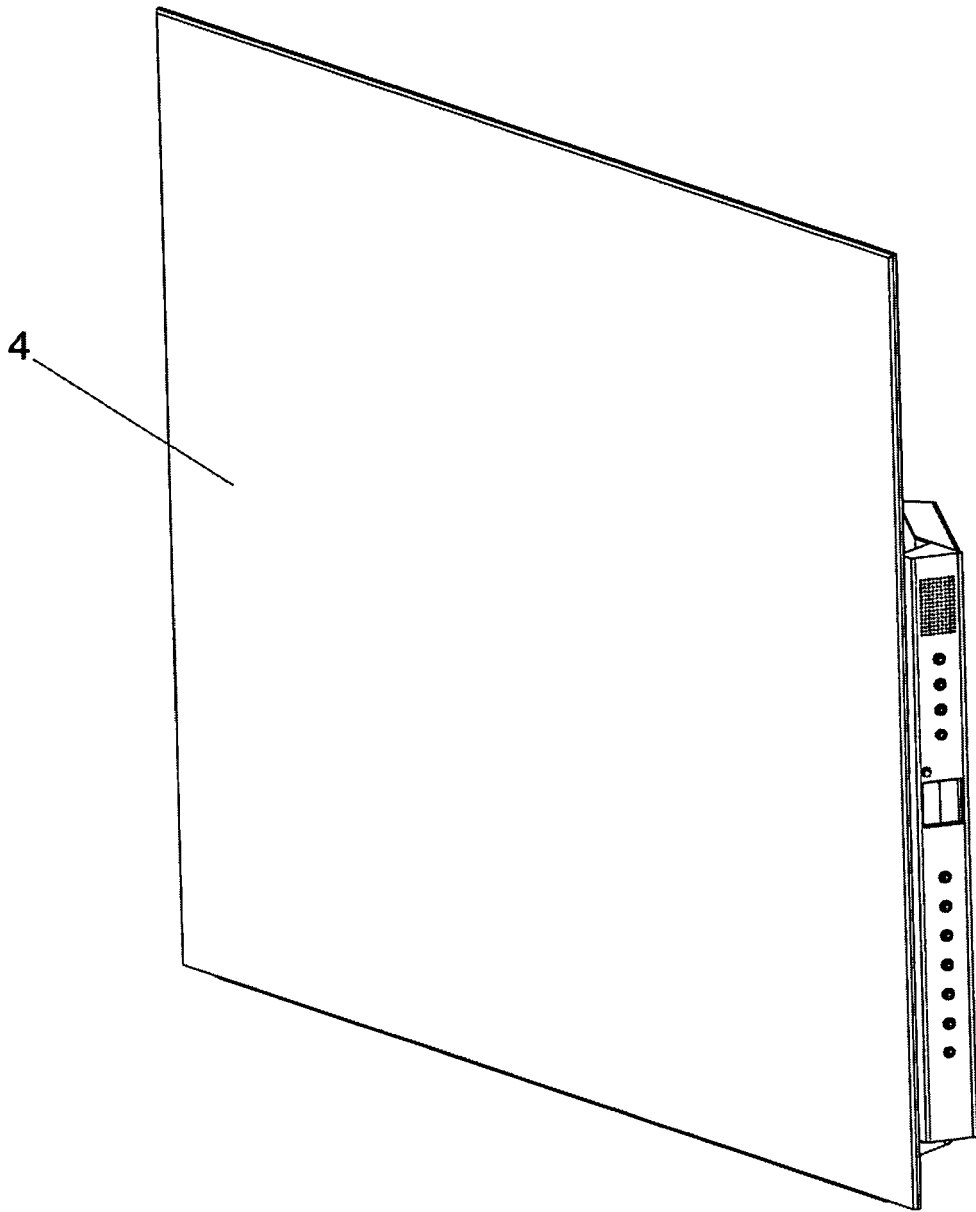


FIG. 1

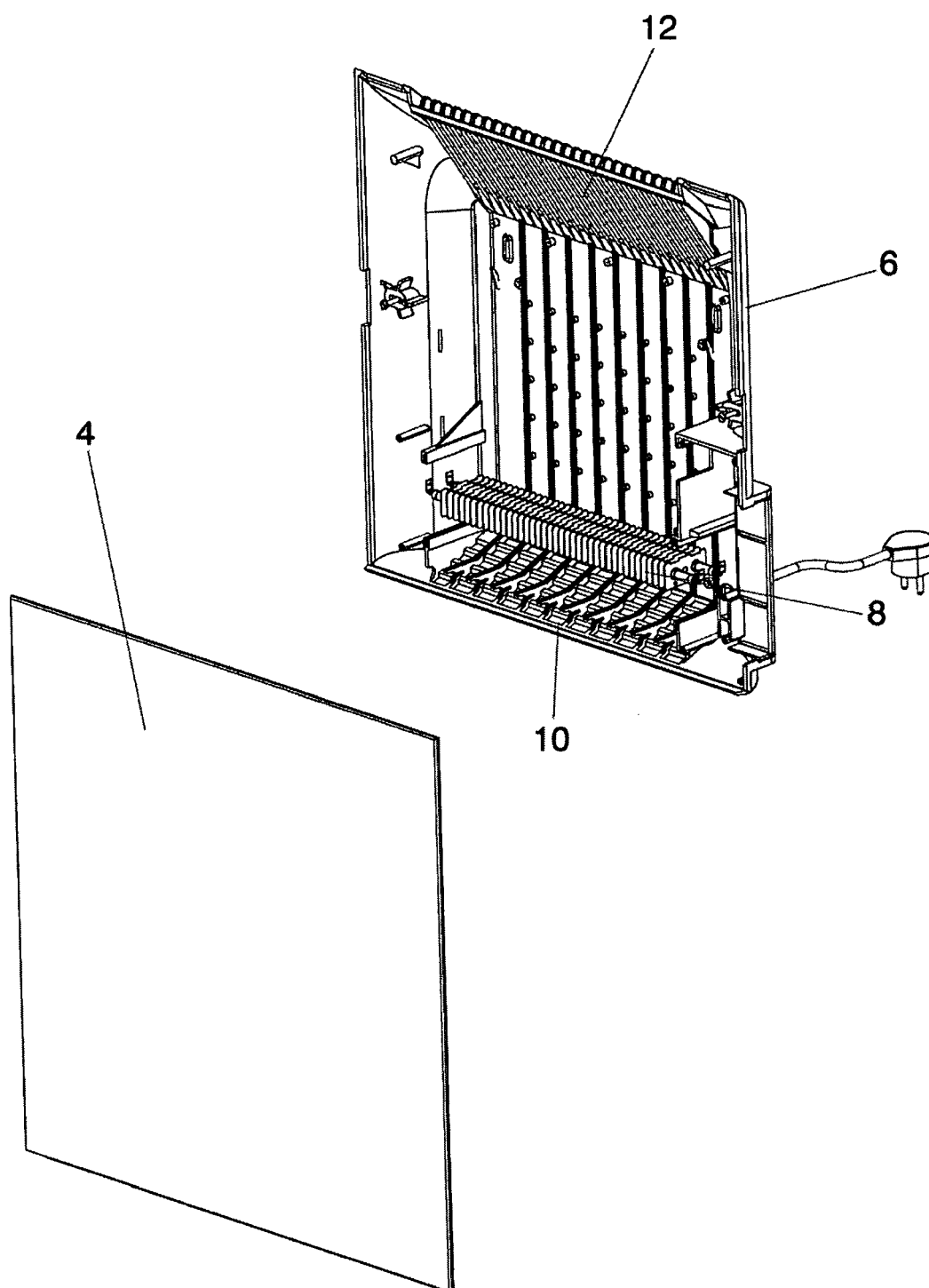


FIG. 2

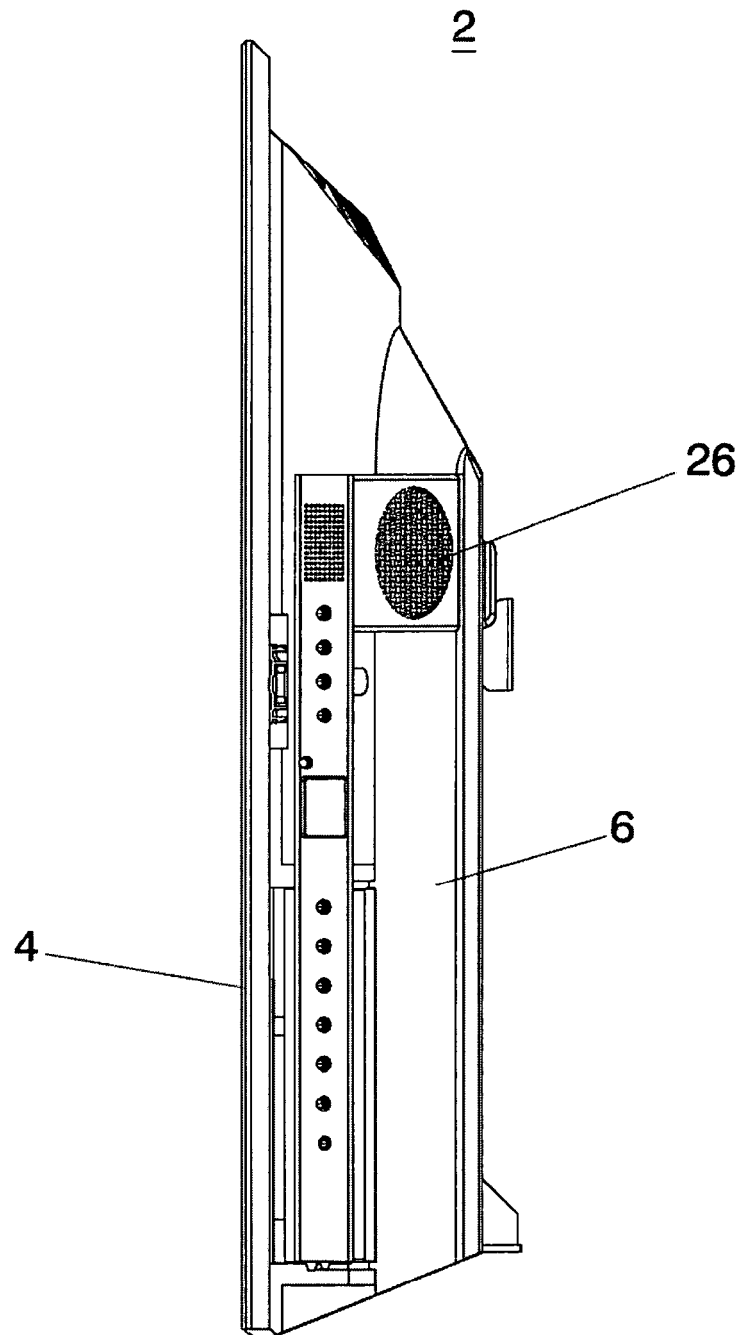


FIG. 3

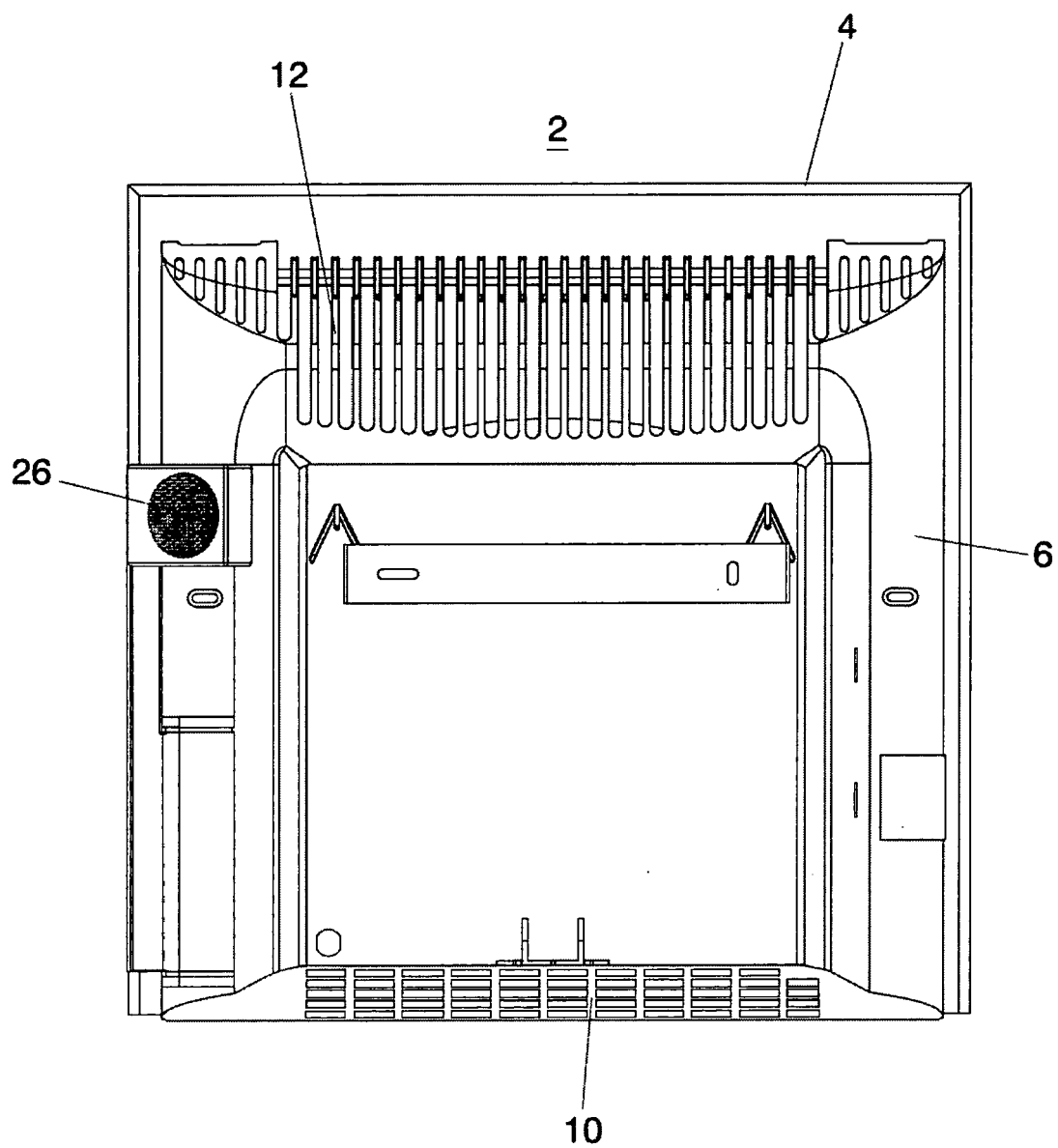


FIG. 4

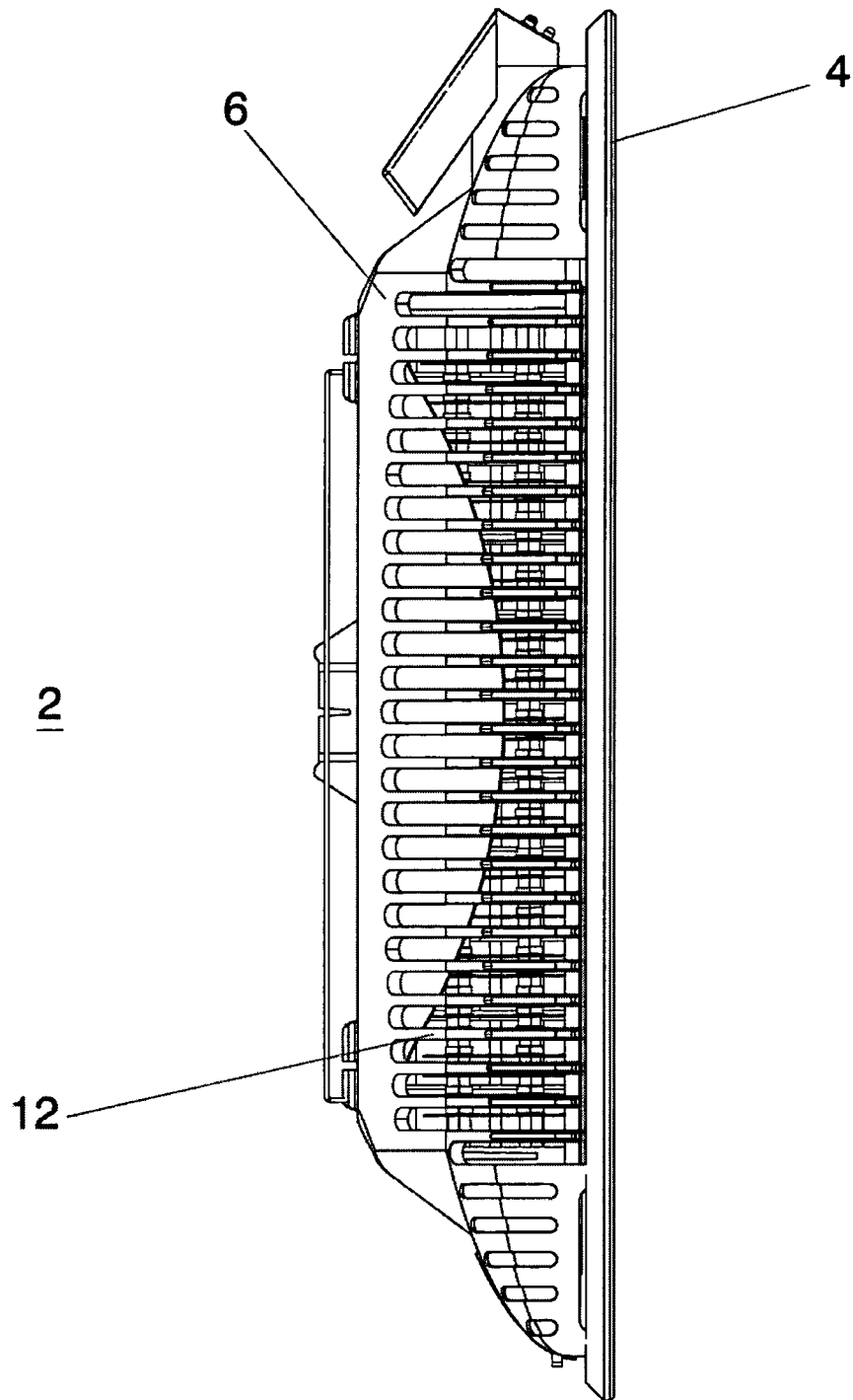


FIG. 5

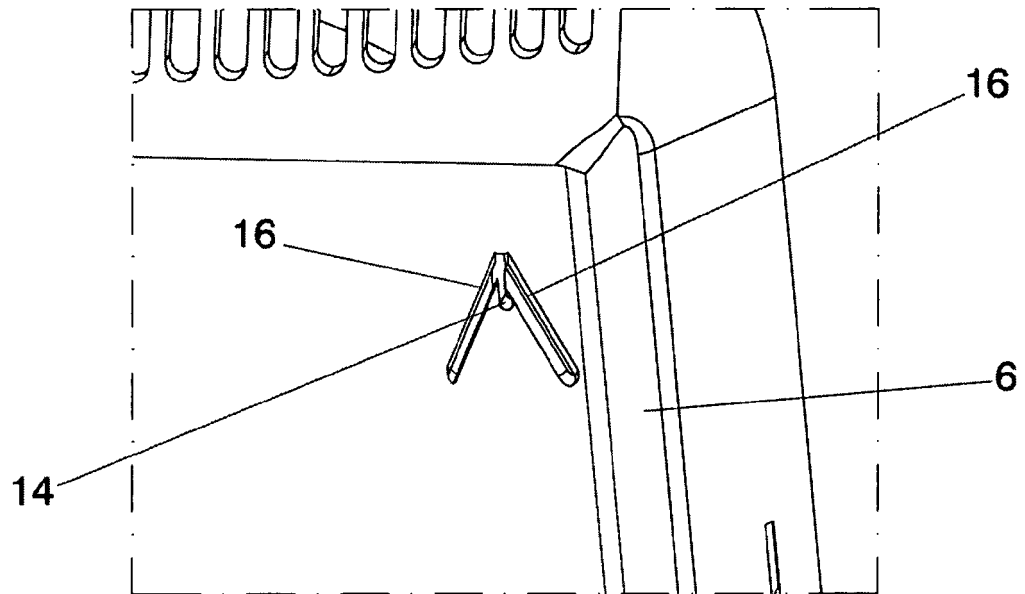


FIG. 6

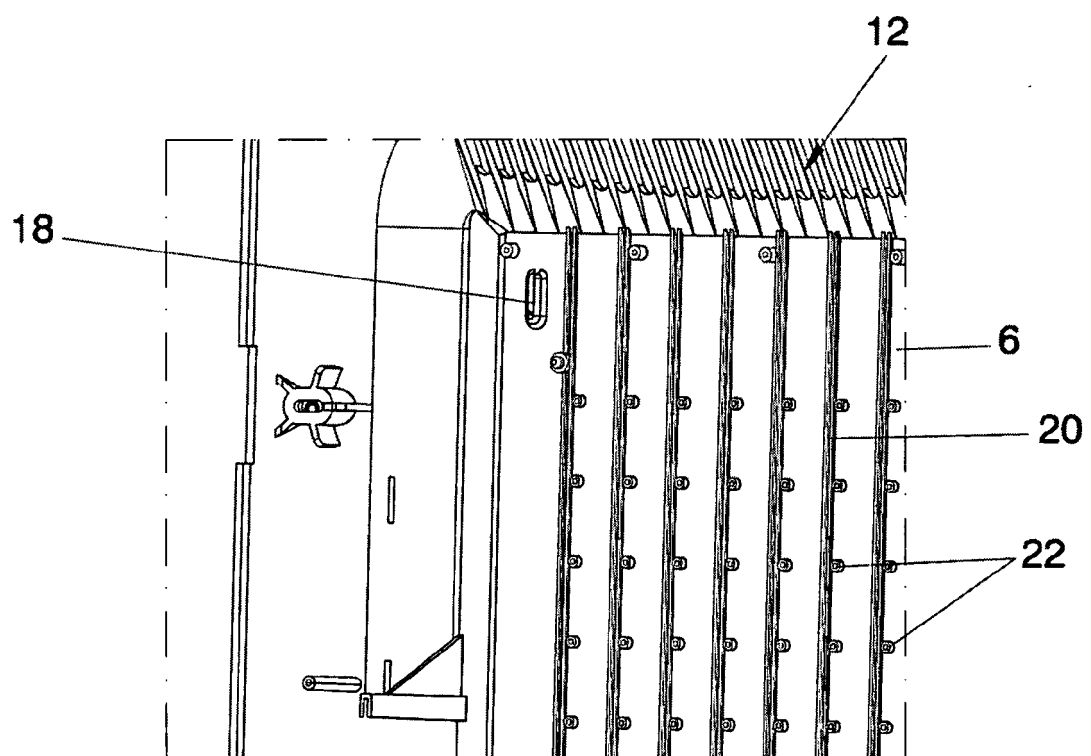


FIG. 7

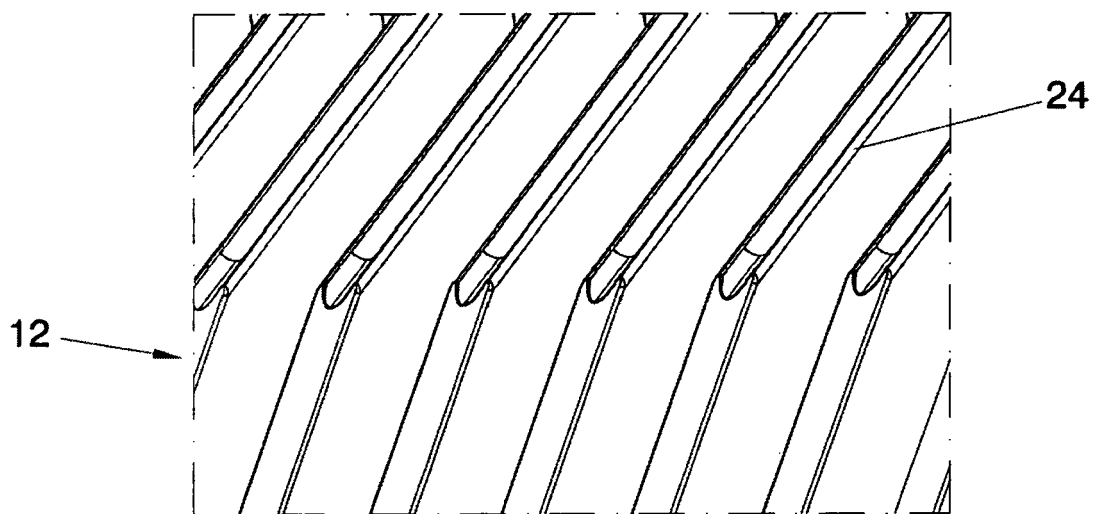


FIG. 8



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Application Number
EP 08 38 0198

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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