



(11) **EP 1 870 654 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
26.12.2007 Bulletin 2007/52

(51) Int Cl.:
F28D 1/047^(2006.01) F28F 1/22^(2006.01)
F28D 1/053^(2006.01)

(21) Application number: **06425505.2**

(22) Date of filing: **20.07.2006**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(72) Inventor: **Casassa, Michele**
c/o Hotech di Cassasa M.&C.S.n.c.
25030 Castelmella (Brescia) (IT)

(30) Priority: **20.06.2006 IT BS20060152**

(74) Representative: **Sangiaco, Fulvia**
BIESSE S.R.L.,
Corso Matteotti 42
25122 Brescia (IT)

(71) Applicant: **Hotech di Casassa M. & C.S.n.c.**
25030 Castelmella (IT)

(54) **Decorative radiator**

(57) The invention concerns a decorative or furnishing radiator, including a front heat radiating panel (11), with both front and rear faces and some heating elements closely coupled and in direct heat exchange contact with the rear face of the front panel. The rear face of the front panel has some grooves (13) and the heating elements are made up of several small pipes (12), in terms of diameter, in which a heat transfer fluid flows, partially or totally set in the above mentioned grooves and closely in contact with the panel.

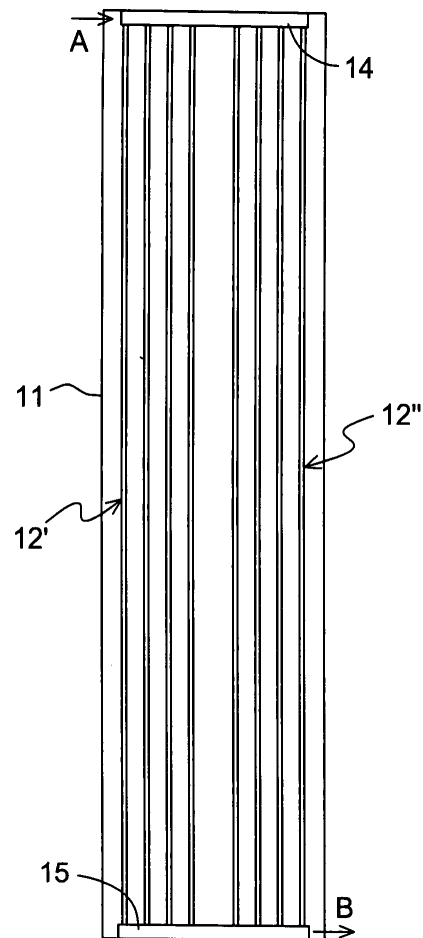


FIG. 2

EP 1 870 654 A2

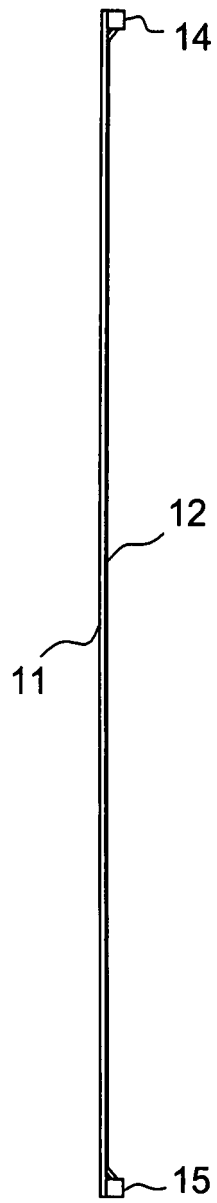


FIG. 3

Description**Field of Invention**

[0001] This invention refers to the field of radiators for heating systems, and in particular it relates to a decorative radiator, also known as a furnishing radiator.

State of Technique

[0002] At least in the domestic heating system not only there are radiators made of several elements obtained from cast iron fusion or from aluminium die-cast alloy and assembled side by side, but also the so-called decorative or furnishing radiators. The use of these furnishing radiators has been getting more and more widespread due to the fact that they are easily adaptable to other furnishing components and due to the fact that they can be extended in height and acquire various and original shapes, thus they can be positioned even in spaces where traditional radiators cannot be fit.

[0003] From the known techniques there are various ways to make furnishing radiators. In accordance with a method of manufacture, such as the one disclosed in EP-0 564 422, radiators are simply made of straight metal pipes, mainly made of steel, both in vertical and horizontal position. These pipes are suitably fixed and they use principle of communicating pipes for the circulation of the heat transfer fluid, usually hot water, between two supply and return manifolds.

[0004] Another method of manufacture, such as the one described in BE-1 009 789, furnishing radiators are made up of several horizontal pipes bent into a U shape with the ends fixed to and communicating with two vertical manifolds.

[0005] Pipes making up these radiators may be exposed and totally visible, but sometimes they are hidden by a front plate or panel whose surface might be flat or machined for decorative purposes. However, in this case the front panel only represents an extra component that does not completely match the radiator's piping.

[0006] There also are other furnishing radiators, like the ones present in documents RU-2 154 775 and US. 2004/182557, with a framework made up of two, front and rear panel, where one of the panels is stamped to outline some preformed channels facing the other panel, closed by the latter and constituting the same number of pipes for the circulation of the heat transfer fluid. Other than being relatively complex, these products lack performance and assembly modularity and they also cannot acquire various shapes, thus are not easily adaptable in every environment.

[0007] However, the kind of the above mentioned radiators - be they be made of pipes or plates - have pipings for relevant sections, which require input and circulation of heat transfer fluid in high quantities without reaching an equivalent thermal balance in terms of heat radiation to the environment to be heated, leading even to a use-

less waste of energy.

Objects and Summary of the Invention

5 [0008] Starting from these preliminary statements, this invention aims at providing a decorative or furnishing radiator improved in terms of structure and construction. In addition, this radiator is simpler and economical to produce, smaller in depth dimensions and above all, under
10 the same heat radiation conditions, it requires much less circulation of heat transfer fluid (hot water), compared to other radiators belonging to the same field leading to more energy saving.

[0009] The above objects are achieved, in according
15 to the present invention, through a furnishing radiator comprised of a front heat-radiating panel and heat exchange elements associated with the rear face of said panel. Heat exchange elements may be formed of a
20 number of pipes of small diameters within which heat transfer fluid flows, and wherein said pipes are closely coupled and get into direct heat exchange contact with the back of the front panel, since they are partially or
25 totally set into the corresponding grooves on the rear face of the above mentioned front panel.

Brief Description of the Drawings

[0010] The invention will however be described in more
30 details further ahead with reference to the enclosed, indicative but not limiting, drawings in which:

Fig. 1 shows a front view of an example of a radiator;
Fig. 2 shows a rear view of the radiator in one possible way of manufacture;

35 Fig. 3 shows a side view of the radiator in Fig. 2;
Fig. 4 shows a rear view of the radiator in another possible way of manufacture; and
Fig. 5 shows an enlarged transverse cross-section
40 of the radiator both in Fig. 2 and Fig. 4.

Detailed Description of the Invention

[0011] As shown, the heating radiator hereby presented includes a front panel 11 and several rear pipes 12
45 defining a heat transfer fluid, usually hot water, circulation circuit.

[0012] The front panel 11 must be heat-radiating. It can be made of metal materials such as aluminium and its alloys, steel and any other similar material or even
50 synthetic material as long as it is a heat-conductor. Dimensions in terms of height and width can be chosen at will, while the thickness might be roughly around 6-10 mm, depending on the material used to make the panel, the shape and the size of the pipe sections to be joined
55 to it, in a way that it turns out to be rigid and self-supporting. The front surface of the panel may be flat - Fig. 1 - or machined, continuous or discontinuous, or even with drillings or decorative openings. Even on the perimeter,

the panel can be made following any shape depending on the environment on which the radiator is to be installed.

[0013] On the back face of the front panel, grooves 13 meant to hold heat transfer fluid circulation pipes 12, can be made. These pipes are small in terms of diameter, around 5 - 12 mm for example. The pipes can be made of copper, aluminium, steel or can even be made of synthetic material, as long as they conduct heat.

[0014] The grooves 13 at the back of the panel 11 shall have a shape suitable to the pipe sections 12 that may be round, elliptic or polygonal. Given that the pipes are small (in terms of diameter) and relatively flexible, they can be bent at will and so the pattern of these grooves 13, is variable depending on the on the shape of the front panel.

[0015] In the example shown in figures 2 and 3, the pipes 12 are straight with their two opposite ends connected to two manifolds 14, 15 and divided in supply pipes 12' and return pipes 12". So, the heat transfer fluid flows into the manifold 14 as per arrow A and flows out of the other manifold as per arrow B.

[0016] In the way of production shown in Fig. 4, for example, the pipes 12 are bent into a U shape and connected to the supply and return manifolds 16, 17 appearing on the same side, with the heat transfer fluid flowing in towards direction C and flowing out towards direction D.

[0017] Practically, the heat transfer fluid circulation pipes 12 are at least partially set in the grooves 13 on the back of the front panel but in close contact for a direct heat exchange with the very same panel. Since they are small in terms of diameter, the pipes hold a very little amount of heat transfer fluid. However, given the mass and the wide radiating surface of the panel, the heat exchange with the air shall be ideal and thus a high energy production.

[0018] Also note that the above described radiator shall also have a back heat-insulating shield. In addition, several radiators can be group-combined and connected between them depending on the desired heat power. Lastly, instead of the heat transfer fluid pipe, an electric resistance can be mounted, in the back grooves of the front panel, in a way to have an electric radiator.

fer fluid flows, partially or totally set into said grooves and closely in contact with the panel.

3. Furnishing radiator according to claims 1 and 2, in which said pipes have circular, elliptic or polygonal sections, and the grooves (13) on the back part of the front panel have a section of the same size as the pipes.
4. Furnishing radiator according to previous claims, in which the pipes (12) are straight and their ends are connected to two heat transfer fluid supply and return manifolds positioned on the opposite sides of the front panel.
5. Furnish radiator according to claims 1-3, in which said pipes are bent and their ends are connected to two heat transfer fluid supply and return manifolds positioned on the same side of the front panel.
6. Furnishing radiator according to any of the previous claims, in which said front panel is made of metal such as aluminium or its alloys, steel and other similar metals, or made of heat conducting synthetic material and said pipes are made of copper, aluminium or other similar material.
7. Furnishing radiator according to claim 6, in which said front panel has a thickness of about 6-10 mm, and can be of any peripheral shape and the front surface may be flat or machined, continuous, discontinuous or crossed by openings, and in which said pipes have a section roughly measure about 5-12 mm.
8. Furnishing radiator according to claim 1, in which the rear face of the front panel has grooves (13) and in which said heating elements are made of electric resistance at least partially or totally set into said grooves and closely in contact with the panel.
9. Furnishing radiator according to any of the previous claims, which may eventually have heat-insulating shield at the back.

Claims

1. Decorative or furnishing heating radiator, **characterised in that** it comprises a heat-radiating panel (11), with a front and rear face, and heat exchange elements closely coupled and in direct contact with the back part of the front panel.
2. Furnishing radiator according to claim 1, in which the back face of the front panel has grooves (13) and in which the said heating elements are formed of small pipes (12), in terms of diameter, in which a heat trans-

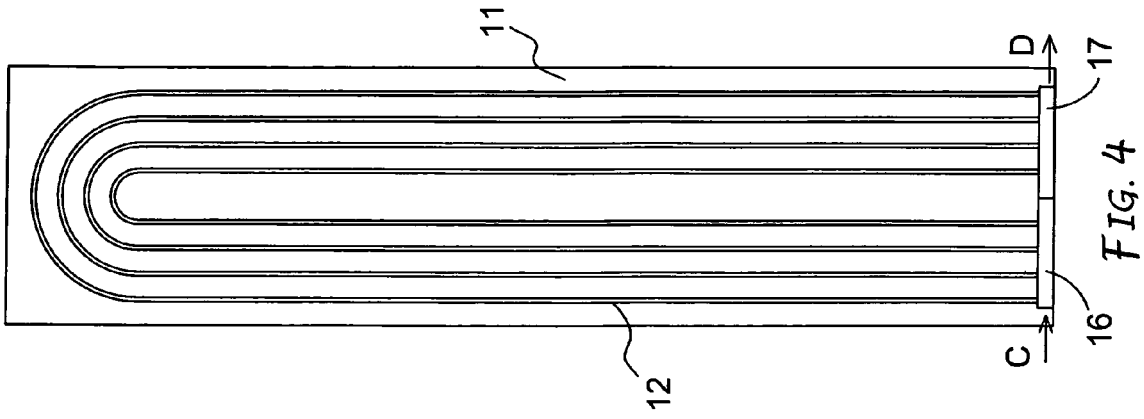
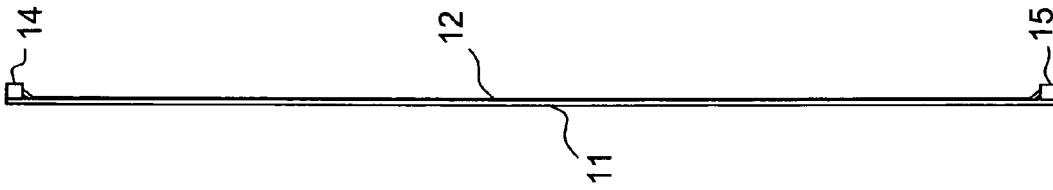
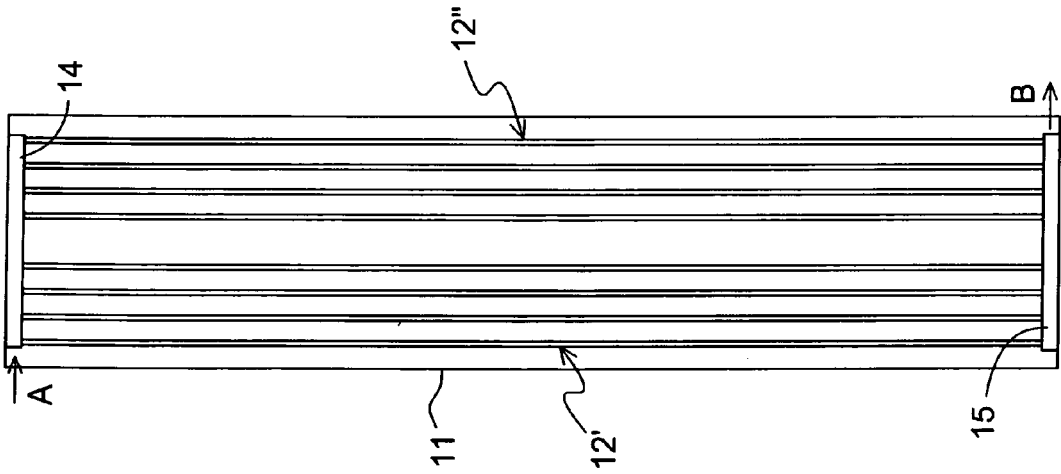
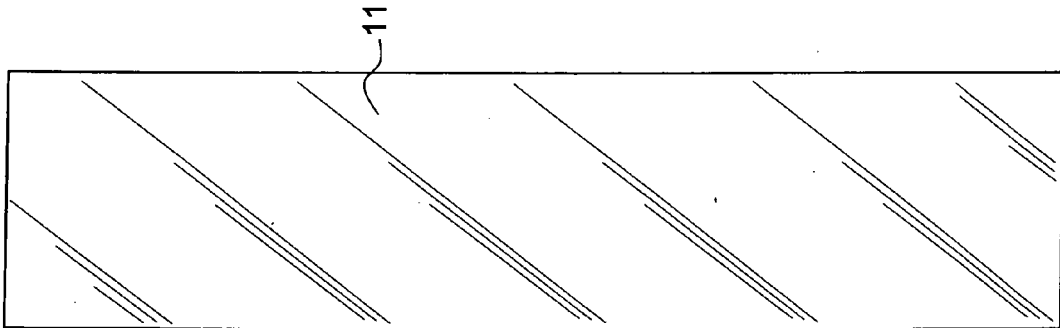
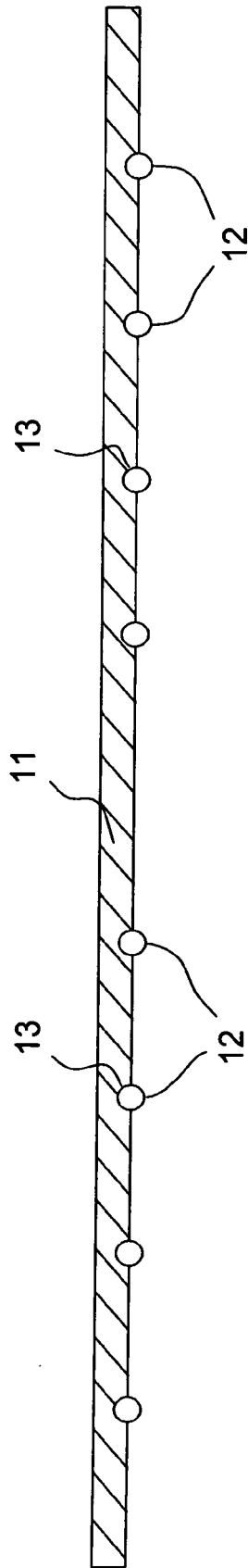


FIG. 5



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

- EP 0564422 A [0003]
- BE 1009789 [0004]
- RU 2154775 [0006]
- US 2004182557 A [0006]