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

(11) **EP 2 685 198 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
15.01.2014 Bulletin 2014/03

(51) Int Cl.:
F28F 9/26 *(2006.01)*

(21) Application number: **13175735.3**

(22) Date of filing: **09.07.2013**

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

(30) Priority: **10.07.2012 IT UD20120015 U**

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(54) **Spacer element for a radiant panel**

(57) Spacer element insertable between the walls (16, 17) of a radiant panel (12) containing a heat-carrying fluid. The spacer element comprises a spacer body (23), hollow inside, having a lower base (25), a lateral wall (27) provided with a plurality of lateral apertures (32) and an upper base (26) substantially parallel to the lower base (25), so as to define a compartment (24) with a substantially cylindrical shape and having a longitudinal axis (X).

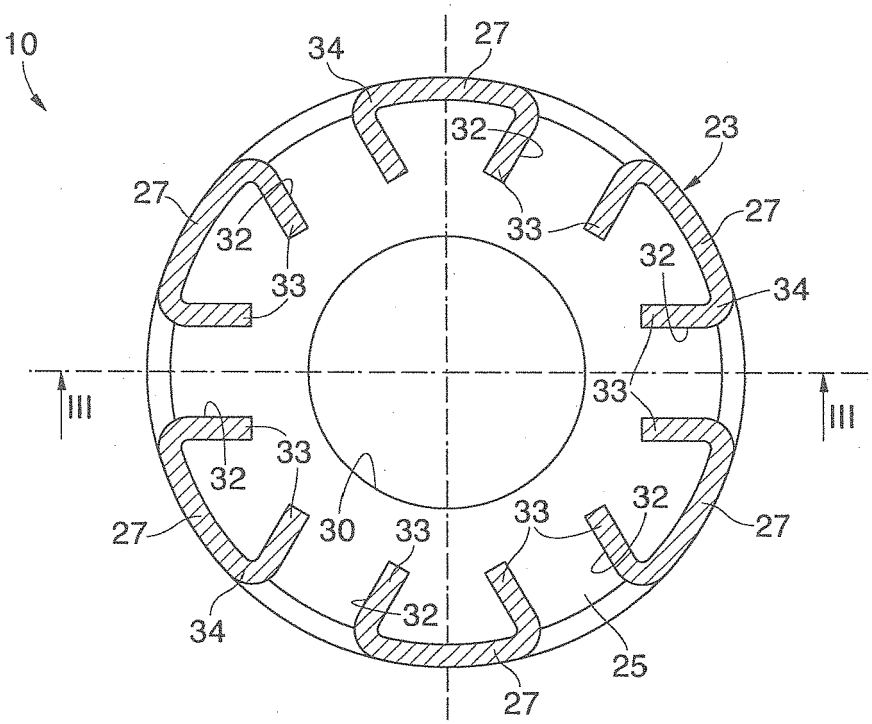

fig. 3

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Description

FIELD OF THE INVENTION

[0001] The present invention concerns a spacer element insertable inside a radiant panel of a heat radiator, so as to prevent its lateral walls from being crushed during the steps when it is connected under pressure with a corresponding connector.

BACKGROUND OF THE INVENTION

[0002] Heat radiators are known, such as for example radiators, comprising one or more radiant panels shaped so as to define inside them a substantially closed compartment to contain a heat-carrying fluid and make it circulate.

[0003] The radiant panels are hydraulically connected to each other by interposing, in twos, a connection element or connector. The connector is welded under pressure to the corresponding radiant panels, to guarantee the fluid-tight seal of the connection.

[0004] To prevent the radiant panels from deforming during the pressure welding steps, it is known to insert inside them a spacer element that contrasts the pressure exerted, thus preventing any possible deformations.

[0005] One type of spacer element is known, comprising a spacer body, hollow inside, having a lower base, a lateral wall provided with lateral apertures and an upper base substantially parallel to the lower base, so as to define a compartment with a substantially cylindrical shape.

[0006] To increase the flow rate of the heat-carrying fluid passing through the spacer element and hence to increase the heat exchange between the radiant panels and the surrounding environment, one solution provides to increase the number of the lateral apertures of the spacer element.

[0007] A spacer element is known, from EP 1681530 in the name of the present Applicant, provided with four and five lateral apertures. By further increasing the number of lateral apertures, however, the problem arises of reciprocal interference between the lips that are made. This means that it is not possible to further increase the number of lateral apertures to obtain a greater flow rate of the fluid.

[0008] Purpose of the present invention is to obtain a spacer element, insertable inside a radiant panel, that allows to increase the delivery capacity of the spacer element without diminishing its resistance to compression.

[0009] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

[0010] The present invention is set forth and characterized in the independent claim, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

[0011] In accordance with the above purpose, a spacer element according to the present invention, which overcomes the limits of the state of the art and eliminates the defects therein, is insertable inside a radiant panel containing a heat-carrying fluid.

[0012] The spacer element comprises a spacer body, hollow inside, having a lower base, a lateral wall provided with a plurality of lateral apertures and an upper base substantially parallel to the lower base, so as to define a compartment with a substantially cylindrical shape and having a longitudinal axis.

[0013] According to a characteristic feature of the present invention, there are at least six of said lateral apertures. Furthermore, the diameter of the lower base and of the upper base has a maximum value of 25 mm.

[0014] According to another feature of the present invention, the transverse width, that is, orthogonal to the longitudinal axis, of each lateral aperture is comprised between 0.2 and 0.3 times said diameter.

[0015] According to this configuration, the six lateral apertures guarantee a greater flow rate of heat-carrying fluid that passes through the spacer element compared with known configurations.

[0016] Advantageously, the number of six lateral apertures constitutes a good compromise between delivery capacity and resistance to compression of the spacer element.

[0017] According to another characteristic feature of the present invention, each of the lateral apertures is angularly equidistant with respect to the adjacent one, so as to make the stream of heat-carrying fluid uniform inside the spacer element. According to another feature of the present invention, each of the lateral apertures comprises at least a lip bent toward the inside of the compartment of the spacer body.

[0018] The lip defines a support, or stiffening element, for the lower base and the upper base of the spacer element, increasing its resistance to compression applied between the upper base and the lower base along the longitudinal axis of the spacer element, at the same time conferring on the spacer element a greater delivery capacity compared with state of the art solutions.

[0019] In one form of embodiment, each lateral aperture has a substantially rectangular shape, and comprises two sides parallel to the longitudinal axis and another two sides substantially orthogonal to the longitudinal axis.

[0020] According to another feature of the present invention, each of the lateral apertures comprises two of said lips.

[0021] The presence of the second lip for each lateral aperture confers an even greater resistance to compression compared to the case with the single lip, maintaining

a high delivery capacity, or in any case higher than in known solutions.

[0022] According to another feature of the present invention, each of the lateral apertures has a substantially rectangular shape.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] These and other characteristics of the present invention will become apparent from the following description of one form of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a part of a heat radiator in which two spacer elements according to the present invention are inserted;
- fig. 2 shows a step in the assembly of the heat radiator in fig. 1;
- fig. 3 is a plan sectioned view of the spacer element in fig. 1;
- fig. 4 is a lateral sectioned view of the spacer element in fig. 1.

[0024] To facilitate comprehension, the same reference numbers have been used, where possible, to identify identical common elements in the drawings.

DETAILED DESCRIPTION OF ONE FORM OF EMBODIMENT

[0025] with reference to fig. 1, a spacer element 10 is inserted inside a heat radiator 11 comprising two radiant panels 12, which are only partly shown, parallel to each other, and a connector 13 interposed between the two radiant panels 12 and connected to them in a sealed manner, so as to form a hydraulic circuit.

[0026] Each radiant panel 12 comprises an inner wall 16 and an outer wall 17 which define a compartment 18 able to contain a heat-carrying fluid, such as for example hot water.

[0027] Normally, the connector 13 is connected to the inner wall 16 of each of the two radiant panels 12 by pressure welding. This operation occurs by bringing a first electrode 19 and a second electrode 20 reciprocally closer (fig. 2), positioned in contact with the corresponding outer walls 17 of the two radiant panels 12.

[0028] The spacer element 10 is able to contrast the pressure exerted by the two electrodes 19 and 20, to prevent the inner walls 16 and the outer walls 17 from deforming, so as to keep the width of each radiant panel 12 unchanged.

[0029] The spacer element 10 comprises a spacer body 23, hollow inside and defining a compartment 24 having a substantially cylindrical shape (figs. 3 and 4).

[0030] The spacer body 23 comprises a lower base 25, an upper base 26, substantially parallel to the lower base 25, and a lateral wall 27; it is also substantially axial-symmetric with respect to its own longitudinal axis X.

[0031] The lower base 25 and the upper base 26 respectively comprise a lower central aperture 30 and an upper central aperture 31, one of which, during use, allows the heat-carrying fluid to pass from the connector 13 to the corresponding radiant panel 12, or vice versa. In this case, the lower central aperture 30 and the upper central aperture 31 have a circular shape and their center corresponds with the longitudinal axis X.

[0032] Six lateral apertures 32 are made in the lateral wall 27, all of them the same and angularly equidistant from each other. In this case, the lateral apertures 32 have a substantially rectangular shape.

[0033] The six lateral apertures 32 entail a greater delivery capacity of the spacer element 10, obtaining an increase in the heat exchange between the radiant panels 12 and the surrounding environment.

[0034] Each lateral aperture 32 comprises two lips 33, parallel to the longitudinal axis X and bent toward the inside of the compartment 24. The lips 33 are associated to the lateral wall 27 in a connection zone 34.

[0035] The lips 33 define a support for the lower base 25 and the upper base 26, increasing the resistance to compression applied along the longitudinal axis of the spacer element 10, and at the same time guaranteeing a greater delivery capacity compared with solutions known in the state of the art.

[0036] In this case therefore, the height of each lip 33 is equal to the height of the compartment 24, and is disposed in abutment with the lower base 25 and the upper base 26.

[0037] To sum up, the configuration of the spacer element 10 in its entirety entails two main advantages: the first is the increase in the delivery capacity, the second is the increase in resistance to compression.

[0038] It is clear that modifications and/or additions of parts may be made to the spacer element 10 as described heretofore, without departing from the field and scope of the present invention.

[0039] It is also clear that, although the present invention has been described with reference to some specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of spacer element, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

Claims

1. Spacer element insertable between the walls (16, 17) of a radiant panel (12) containing a heat-carrying fluid, and comprising a spacer body (23), hollow inside and having a lower base (25), a lateral wall (27), provided with a plurality of lateral apertures (32) and an upper base (26) substantially parallel to said lower base (25), so as to define a compartment (24) with a substantially cylindrical shape and having a longi-

tudinal axis (X), **characterized in that** there are at least six of said lateral apertures (32), **and in that** the diameter of said lower base (25) and said upper base (26) has a maximum value of 25 mm.

2. Spacer element as in claim 1, **characterized in that** the transverse width, that is, orthogonal to said longitudinal axis (X), of each lateral aperture (32), is comprised between 0.2 and 0.3 times said diameter.

3. Spacer element as in claim 1 or 2, **characterized in that** each of said lateral apertures (32) is offset and equidistant angularly with respect to the adjacent one.

4. Spacer element as in any claim hereinbefore, **characterized in that** each of said lateral apertures (32) comprises at least a lip (33) bent toward the inside of said compartment (24) of said spacer body (23) to obtain said lateral apertures (32).

5. Spacer element as in claim 4, **characterized in that** each of said lateral apertures (32) comprises two of said lips (33).

6. Spacer element as in claim 4 or 5, **characterized in that** each of said lips (33) is parallel to said longitudinal axis (X).

7. Spacer element as in any claim hereinbefore, **characterized in that** each of said lateral apertures (32) has a substantially polygonal shape.

8. Spacer element as in any claim hereinbefore, **characterized in that** each of said lips (33) has a height substantially equivalent to that of said compartment (24).

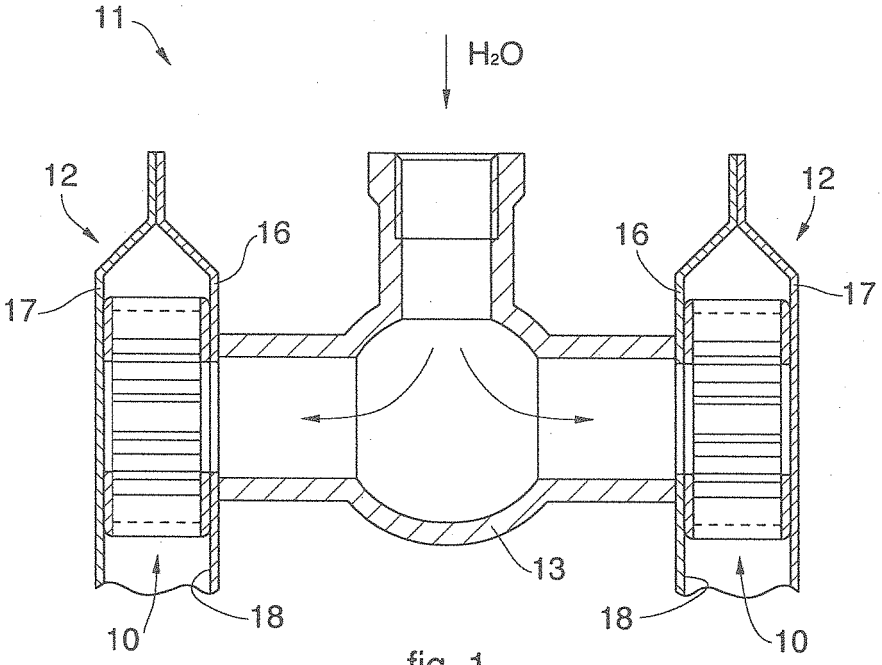
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fig. 1

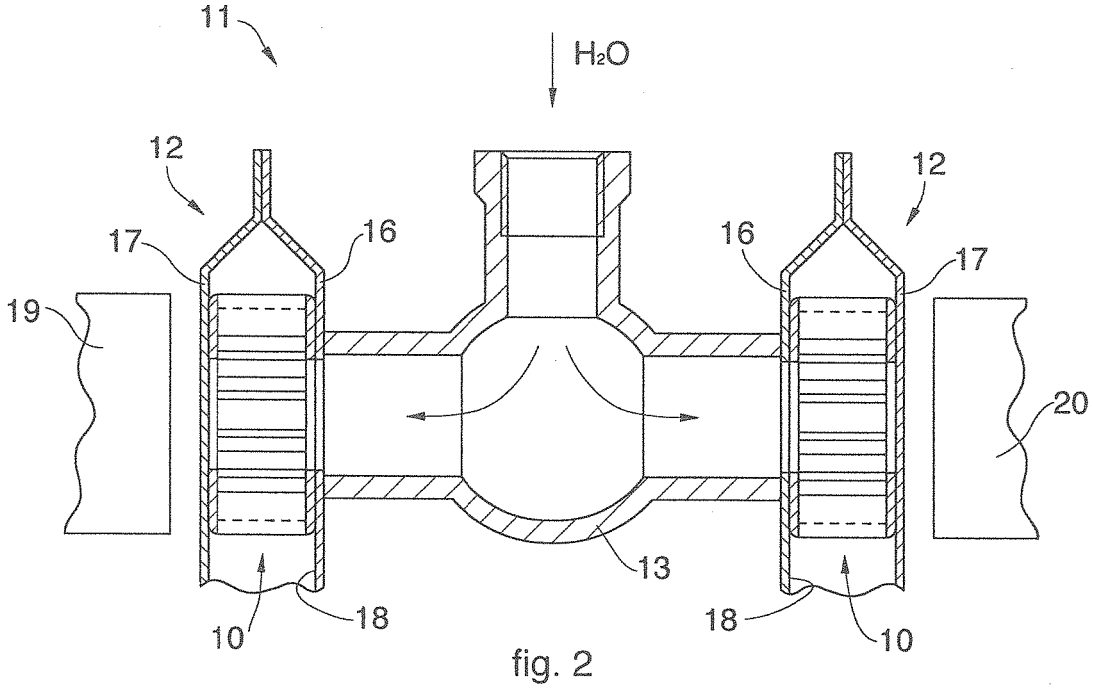
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fig. 2

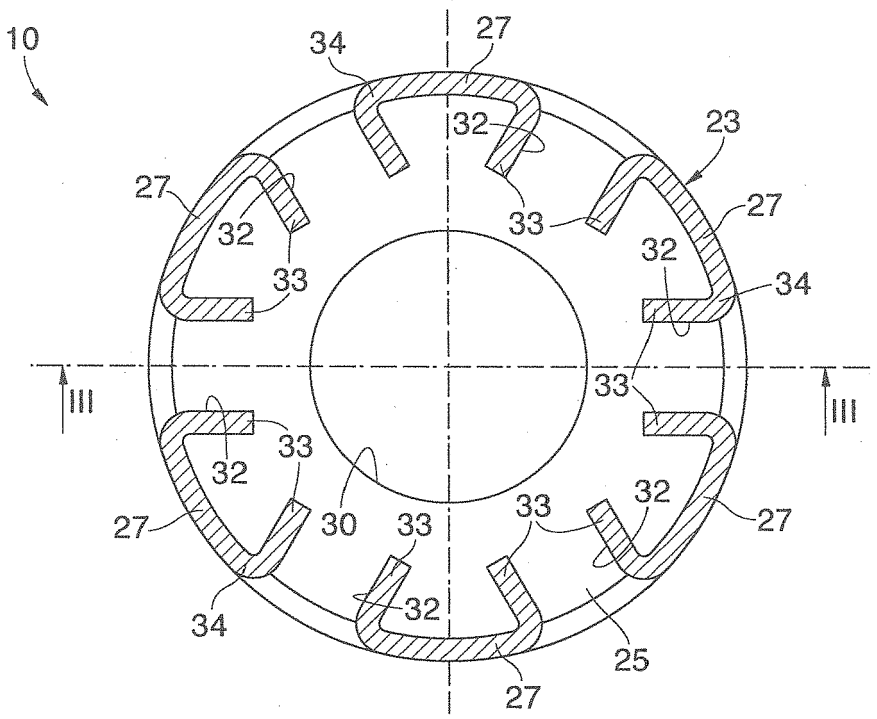
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fig. 3

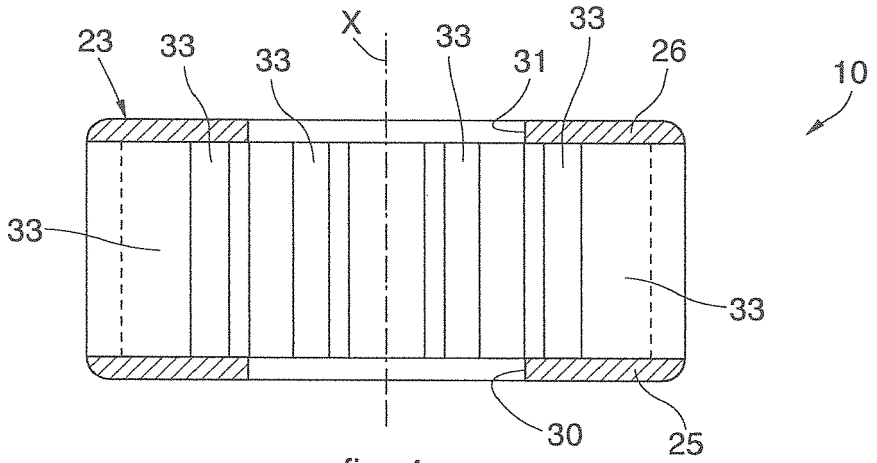
X
23
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fig. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1681530 A **[0007]**