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(71) Applicant: **Viessmann Climate Solutions SE**
35108 Allendorf (DE)

(72) Inventors:
- **Chamera, Sebastian**
  75-847 Koszalin (PL)
- **Lyczko, Marcin**
  75-381 Koszalin (PL)

(74) Representative: **Wolf, Michael et al**
Patent- und Rechtsanwälte
Wolf & Wolf
Hirschstrasse 7
63450 Hanau (DE)

(54) **CONTINUOUS-FLOW HEATER**

(57) The invention relates to a continuous-flow heater comprising a body (1) and a channel (2) extending in the body (1) and carrying water, wherein an opening (4) forming an access to the channel (2) and closed by a closure element (3) is provided on the body (1), wherein the closure element (3) has a heat transfer region (3.1) arranged in the region of the opening (4) and being in contact with the water. According to the invention it is provided that the closure element (3) is formed to be plate-shaped and, particularly preferably, to be provided with a stamping forming the heat transfer region (3.1).

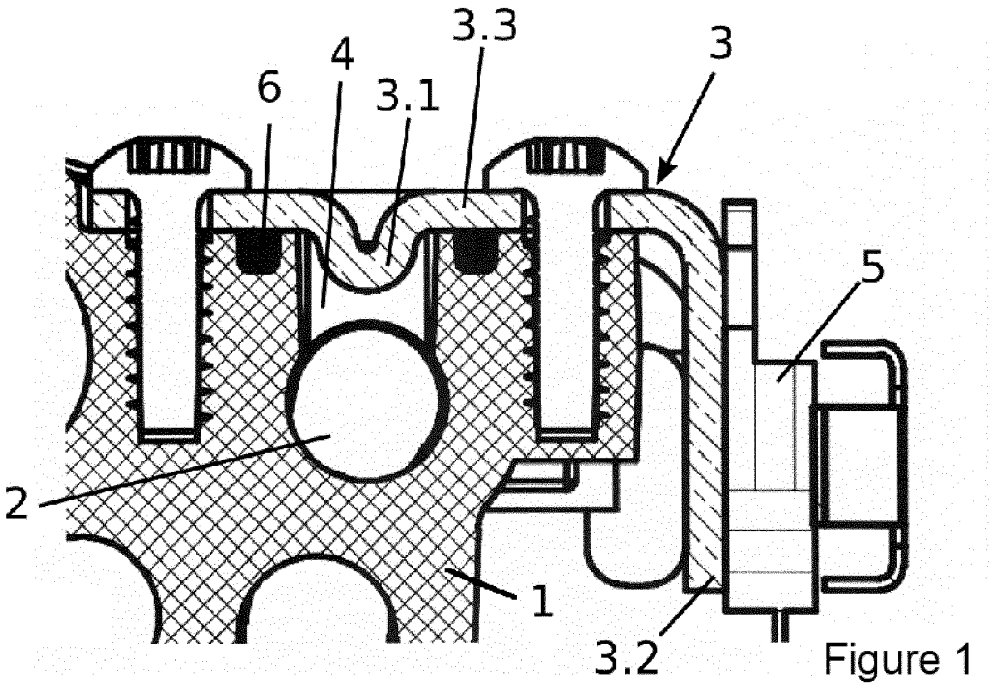

Figure 1

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Description

[0001] The invention relates to continuous-flow heater according to the preamble of patent claim 1.

[0002] A continuous-flow heater of the type mentioned at the beginning is known from the document EP 2 489 956 B1. There, a continuous-flow heater is shown which has a body and a channel extending in the body and carrying water. An opening forming an access to the channel and closed by a closure element is provided on the body, wherein the closure element has a heat transfer region arranged in the region of the opening and being in contact with the water.

[0003] It is the object of the invention to improve a continuous-flow heater of the type mentioned above. In particular, a continuous-flow heater constructed in a particularly simple manner is to be created.

[0004] This object is achieved with a continuous-flow heater of the type mentioned above by the features listed in the characterizing part of patent claim 1.

[0005] According to the invention, it is thus provided that the closure element is formed to be plate-shaped. It is particularly preferred that the closure element is also provided with a stamping forming the heat transfer region.

[0006] In other words, the continuous-flow heater according to the invention is thus characterized in that the closure element and the heat transfer region are formed in one piece by bending or, preferably, stamping. As a result, the continuous-flow heater can be manufactured in a particularly simple and cost-effective manner while still maintaining high energy efficiency.

[0007] Again in other words, it is thus particularly preferably provided that the closure element has a projection extending into the opening and comprising the heat transfer region. It is thus provided that the closure element is bulged into the opening, which has the additional advantage that, on the one hand, a large heat transfer region is created, and, on the other hand, the bulge also provides for stiffening of the closure element.

[0008] Other advantageous refinements of the continuous-flow heater according to the invention arise from the dependent patent claims.

[0009] For the sake of completeness, reference is also made to the document US 6,892,796 B1.

[0010] The continuous-flow heater according to the invention, including its advantageous refinements according to the dependent patent claims, is explained in more detail below by means of the graphic representation of two preferred exemplary embodiments.

[0011] In the figures

Figure 1 shows a cross-section of a first embodiment of the continuous-flow heater according to the invention with its body and the closure element;

Figure 2 shows a perspective view of the continuous-flow heater shown in Figure 1 with a total of four electronic components;

Figure 3 shows a top view of the continuous-flow heater according to Figure 1 with the closure element 3 removed, looking into the channel 2;

Figure 4 shows a perspective view of the closure element according to Figure 1 (without the electronic components);

Figure 5 shows a cross-section of the closure element according to Figure 4;

Figure 6 shows a cross-section of a second, particularly simple embodiment of the continuous-flow heater according to the invention with the closure element, but without the particularly preferred stamping; and

Figure 7 shows a perspective view of the closure element according to Figure 6 (again without the electronic components) .

[0012] The continuous-flow heater shown in the figures initially consists in a known manner of, among other things, a body 1 and a water-carrying channel 2 extending in the body 1. In this connection, an opening 4 forming an access to the channel 2 and closed by a closure element 3 is provided on the body 1, wherein the closure element 3 has a heat transfer region 3.1 arranged in the region of the opening 4 and being in contact with the water.

[0013] It is essential for the continuous-flow heater according to the invention that the closure element 3 is formed to be plate-shaped and, particularly preferably (compare Figures 1 to 5), is provided with a stamping forming the heat transfer region 3.1. Figures 6 and 7 show a solution according to the invention without the mentioned stamping.

[0014] As can be seen from Figures 1 and 2, it is provided in a particularly preferred manner that the heat transfer region 3.1, on the one hand, and an arrangement region 3.2 for an electronic component 5, on the other hand, are provided on the closure element 3. In more concrete terms, it is thus preferably provided that at least one heat-emitting electronic component 5 is arranged on the closure element 3. Fixing the component 5 to the closure element 3 is preferably carried out by means of a spring-loaded clamping strip (not shown separately). In the solution according to Figures 6 and 7, the electronic component 5 is arranged directly on the heat transfer region 3.1.

[0015] As is readily apparent in particular from Figures 1 and 6, heat released by the electronic component 5 can thus be dissipated via the closure element 3 directly to the water flowing through the channel 2.

[0016] It is further particularly preferred here that the water-carrying channel 2 is arranged between a cold water connection and an electrical heating device (the cold water connection and the heating device are not shown separately). This measure ensures that the electronic component 5 comes into contact with the coldest water

available in the continuous-flow heater and in this way can dissipate as much heat as possible or be cooled as well as possible.

[0017] As can be seen in particular from Figure 3 (but can ultimately also be derived from Figure 7), it is preferably provided that for a particularly intensive heat transfer, the opening 4 is formed to be elongated and to extend along the channel 2. More precisely, it is provided in a particularly preferred manner that a length of the opening 4 extending along the channel 2 corresponds to at least three times a width of the channel 2.

[0018] Furthermore, in order to improve the heat transfer, but also to increase the pressure stability of the closure element 3 in the solution according to Figures 1 to 5, it is preferably provided that the stamping forming the heat transfer region 3.1 is formed extending over the entire opening 4. In addition, it is preferred that the channel 2 is formed to be unobstructed by the heat transfer region 3.1.

[0019] Furthermore, it is preferably provided that the closure element 3 is formed from metal.

[0020] A further particularity is that the body 1 is preferably formed from plastics. Furthermore, it is preferably provided that a sealing element 6, which preferably completely encloses the opening 4, is arranged between the body 1 and the closure element 3.

[0021] To implement a simple assembly, it is further preferably provided that the body 1 and the closure element 3, in particular a fastening region 3.3 of the closure element 3, are formed to be screwed together (preferably with self-tapping screws). In this case, the heat transfer region 3.1 is preferably located completely within the fastening region 3.3.

[0022] Furthermore, with reference in particular to Figures 4 and 5, it is preferably provided that the arrangement region 3.2 is formed with a flat surface. Finally, it is also preferably provided that the arrangement region 3.2 in the solution according to Figures 1 to 5 is formed at an angle to the fastening region 3.3 of the closure element 3. As already stated above, in the solution according to Figures 6 and 7, the heat transfer region 3.1 and the arrangement region 3.2 practically coincide.

REFERENCE LIST

[0023]

1	body
2	channel
3	closure element
3.1	heat transfer region
3.2	arrangement region
3.3	fastening region
4	opening
5	electronic component
6	sealing element

Claims

1. A continuous-flow heater comprising a body (1) and a channel (2) extending in the body (1) and carrying water, wherein an opening (4) forming an access to the channel (2) and closed by a closure element (3) is provided on the body (1), wherein the closure element (3) has a heat transfer region (3.1) arranged in the region of the opening (4) and being in contact with the water,
characterized in
that the closure element (3) is formed to be plate-shaped.

2. The continuous-flow heater according to claim 1,
characterized in
that the plate-shaped closure element (3) is formed to be provided with a stamping forming the heat transfer region (3.1).

3. The continuous-flow heater according to claim 1 or 2,
characterized in
that the opening (4) is formed elongated and extending along the channel (2).

4. The continuous-flow heater according to any one of claims 1 to 3,
characterized in
that a length of the opening (4) extending along the channel (2) corresponds to at least three times a width of the channel (2).

5. The continuous-flow heater according to any one of claims 1 to 4,
characterized in
that the stamping forming the heat transfer region (3.1) is formed extending over the entire opening (4).

6. The continuous-flow heater according to any one of claims 1 to 5,
characterized in
that the heat transfer region (3.1), on the one hand, and an arrangement region (3.2) for an electronic component (5), on the other hand, are provided on the closure element (3).

7. The continuous-flow heater according to any one of claims 1 to 6,
characterized in
that a heat-emitting electronic component (5) is arranged on the closure element (3).

8. The continuous-flow heater according to any one of claims 1 to 7,
characterized in
that the water-carrying channel (2) is arranged between a cold water connection and an electric heating device.

9. The continuous-flow heater according to any one of claims 1 to 8,
characterized in
that the closure element (3) is formed from metal.

10. The continuous-flow heater according to any one of claims 1 to 9,
characterized in
that a sealing element (6) preferably completely enclosing the opening (4) is arranged between the body (1) and the closure element (3).

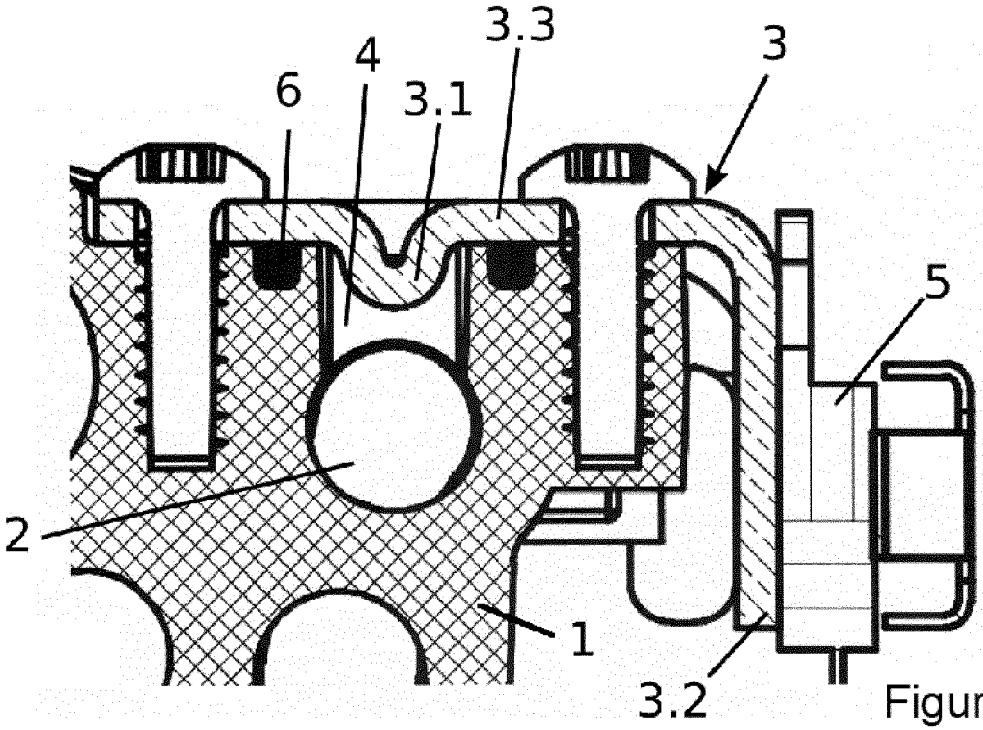

Figure 1

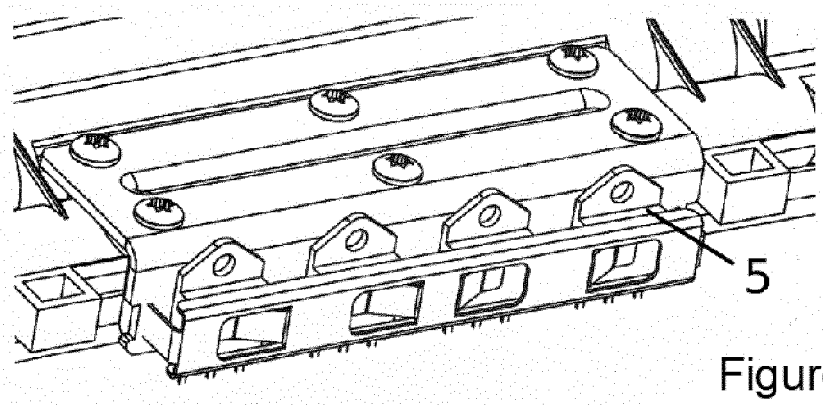

Figure 2

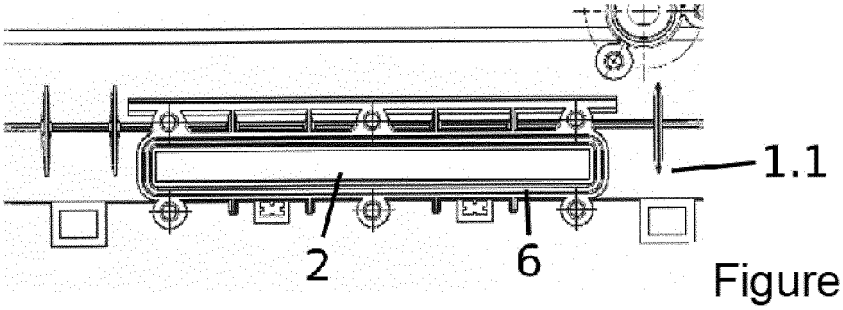

Figure 3

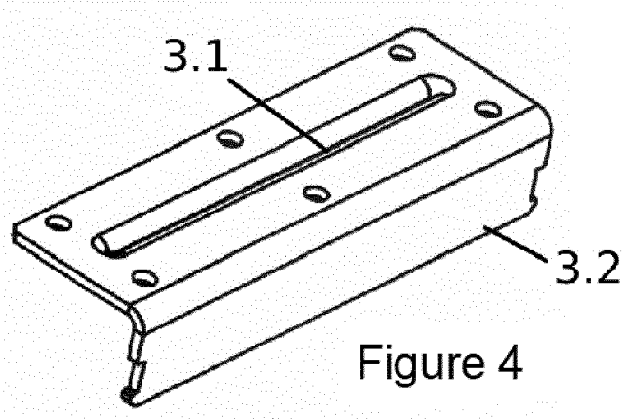

Figure 4

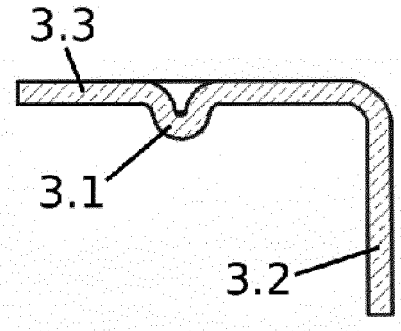

Figure 5

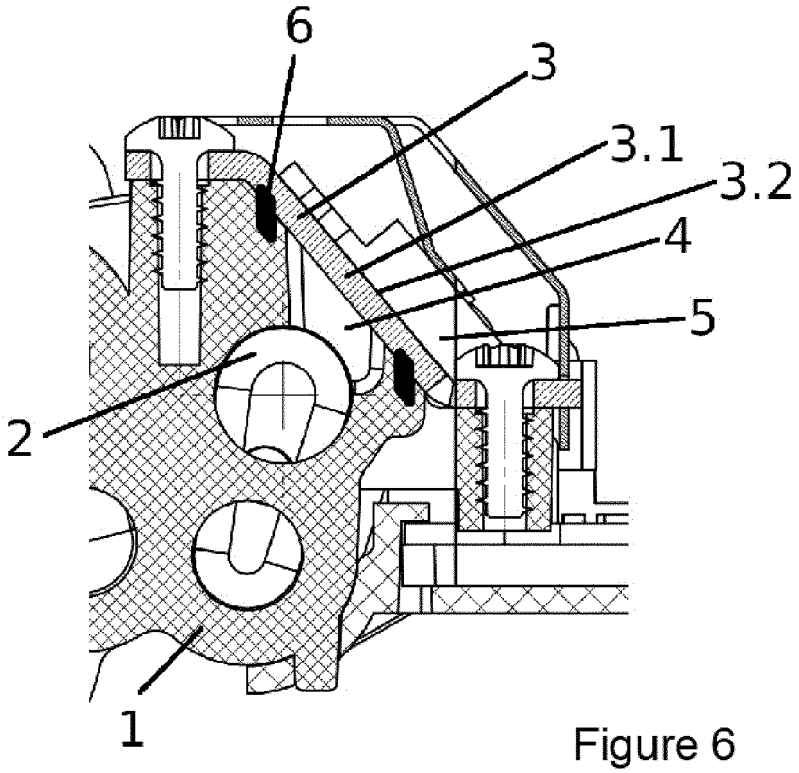

Figure 6

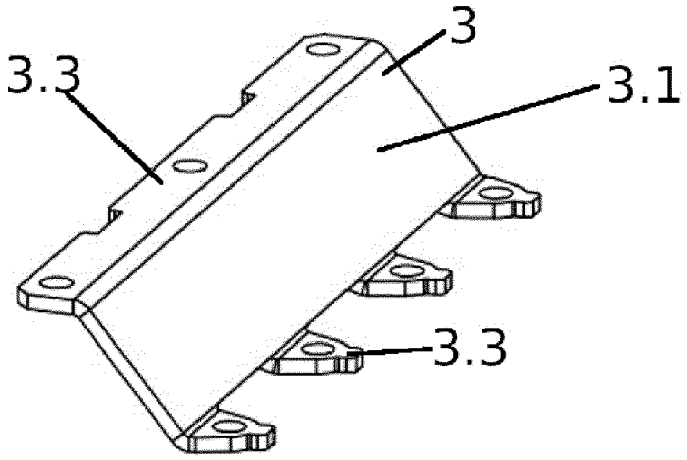

Figure 7

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EUROPEAN SEARCH REPORT

Application Number
EP 21 46 1624

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 10 2013 021286 A1 (STIEBEL ELTRON GMBH & CO KG [DE]) 25 June 2015 (2015-06-25) * paragraphs [0019] - [0028]; figures 1-3 *	1-10	INV. F24H1/12 F24H9/20 H05B1/02
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TECHNICAL FIELDS SEARCHED (IPC)

F24H
F24D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	4 May 2022	Hoffmann, Stéphanie

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- US 6892796 B1 **[0009]**