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(54) **Assembly of a burner and a burner housing**

(57) An assembly of a burner and a burner housing, in which the burner housing comprises a heat exchanger and a burner cap and the burner comprises at least a burner deck, the burner deck being mountable in the burner housing such that the burner deck, after mounting, is located substantially between the burner cap and

the heat exchanger, the burner deck being manufactured substantially from a perforated plate, which plate is preformed such that, in use, it deforms according to a preselected deformation under the influence of the combustion heat, the burner deck being clamped in the burner housing, for instance with a longitudinal edge.

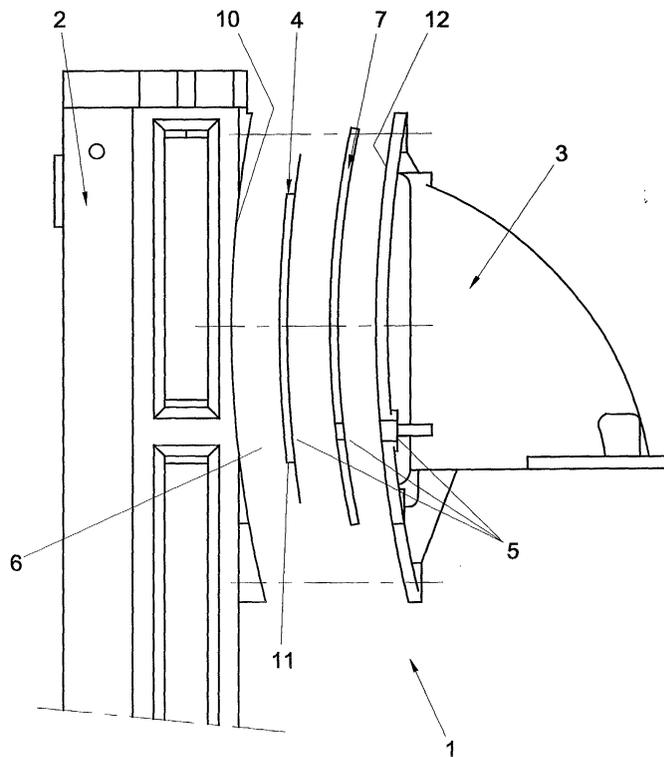


FIG. 1

Description

[0001] The present invention relates to an assembly of a burner and a burner housing.

[0002] Such an assembly is known per se.

[0003] In a known assembly of a burner and a burner housing, the burner housing comprises a heat exchanger and a burner cap; in the known assembly, the burner comprises a burner deck and a frame. In mounting, the frame in which the burner deck is mounted is arranged on the burner cap of the known assembly the burner cap of the known assembly. This burner deck is connected with the frame, for instance by means of spot welding. After mounting of the frame with the burner cap in the burner housing, the burner deck is located opposite the heat exchanger to ensure an optimum heat transfer. In fact, the combustion of combustible gases takes place on a side of the burner deck facing the heat exchanger. The burner housing is usually manufactured from a material having a coefficient of thermal expansion that is relatively low with respect to the material of the burner, while, moreover, the wall thickness thereof substantially exceeds that of the burner deck. Both the burner cap and the burner deck are often manufactured from plate-shaped metal. This plate-shaped metal usually has a relatively high coefficient of thermal expansion. The burner deck is provided with perforations through which, in use, gases to be burned, premixed via the burner cap, flow into the combustion space. Moreover, this burner deck expands relatively more than the burner housing and the burner cap because the burner deck is exposed to a higher temperature than the temperature to which the burner housing is exposed. In particular the burner cap is practically not heated. The difference in expansion between the burner deck and the burner cap will even be greater if the burner cap is made as a casting because the cast material has a lower coefficient of expansion than the plate material from which the burner deck is manufactured. In such a case, the burner cap may, for that matter, be a part of the burner housing that is fixedly cast integral therewith, but may also be made as a separate casting. The difference in expansion is counteracted by the frame manufactured from plate material. As a result of the very high service temperatures, the burner deck is subject to heavy wear. Also, the frame between the burner cap and the burner deck may be subject to wear. If necessary, replacement of the burner deck is possible without necessarily requiring replacement of the whole assembly. In fact, the burner deck and the frame are mountable in the burner housing and are therefore also demountable for the purpose of, for instance, inspection and replacement.

[0004] A drawback of such an assembly is that in mounting at least a burner deck and a frame have to be arranged in the burner housing, which involves working hours and therefore labor costs. Such a drawback also prevails if the burner deck and/or the frame have to be replaced.

[0005] Another drawback is that the frame occupies space that cannot be used for combustion.

[0006] It is an object of the invention to meet the above drawbacks. An assembly according to the invention is therefore characterized by the features of claim 1.

[0007] This has the advantage that in mounting, instead of arranging a frame and a burner deck, only the burner deck needs to be arranged. This saves working hours and labor costs. Moreover, it is no longer necessary to produce a frame so that this saves material and production costs. A further advantage is that the dimensions and the design of the burner deck can be largely adjusted to an optimum utilization of the combustion space. With the preformation, the direction of the expansion is predetermined, and buckling is prevented. The burner deck can be placed relatively loose and can be simply enclosed between the burner cap and the heat exchanger.

[0008] In an advantageous embodiment, an assembly according to the invention is further characterized by the features of claim 2.

[0009] This has the advantage that the burner deck can be very rapidly mounted in the burner housing. This saves labor costs. Moreover, the preselected deformation occurring, in use, under the influence of the combustion space is limited only in the positions where the at least one dowel pin is arranged, as a result of the fixation on the burner cap. The or each dowel pin is preferably provided near a longitudinal edge of the burner or, in a mounted assembly, is included in a part enclosed between the burner cap and the heat exchanger in a position where only little deformation occurs.

[0010] In an alternative embodiment, an assembly according to the invention is characterized by the features of claim 3.

[0011] This has the advantage that the burner deck can be fastened on the burner cap even more rapidly and simply since no dowel pin needs to be provided. This saves working hours and labor costs in mounting and replacement. Moreover, the burner deck therefore has more space for deformation. Besides, it is observed that the burner deck can also be mounted on the heat exchanger. When using a heat exchanger manufactured from a casting, the dowel pins can be cast integral therewith, in that case.

[0012] In an even more advantageous embodiment, an assembly according to the invention is further characterized by the features of claim 4.

[0013] This has the advantage that, in use, the heat transfer can take place optimally.

[0014] In a very advantageous embodiment, an assembly according to the invention is further characterized by the features of claim 5.

[0015] This has the advantage that the burner deck can closely contact the burner cap without requiring the arrangement of deformations, such as recesses or flanged rims, in the burner deck.

[0016] In a further very advantageous embodiment,

an assembly according to the invention is further characterized by the features of claim 6.

[0017] This has the advantage that a possible slit available before use between the burner deck and the burner cap, or a slit formed during use as a result of the unequal expansion of the burner deck and the burner cap, can be sealed by the packing.

[0018] In an advantageous embodiment, an assembly according to the invention is further characterized by the features of claim 7.

[0019] This has the advantage that the burner deck, in use, expands under the influence of the combustion heat in the direction of the heat exchanger, which, in use, results in an optimum heat transfer.

[0020] The invention also relates to a burner housing intended for use in an assembly of a burner and a burner housing.

[0021] The invention also relates to a burner deck intended for use in an assembly of a burner and a burner housing.

[0022] The invention is further explained with reference to a drawing, in which:

Fig. 1 is a section of a first embodiment of the assembly according to the invention;

Fig. 2 is a section of a second embodiment of the assembly according to the invention.

[0023] Fig. 1 shows a burner housing 1 comprising a heat exchanger 2 and a burner cap 3. Located between the burner cap 3 and the heat exchanger 2 is a burner deck 4. The burner deck 4 may be fixed on the burner cap 3, for instance with at least one dowel pin (not shown) to be placed in a position 5. However, the burner deck 4 may also be clamped on the burner cap 3 with, for instance, a longitudinal edge (not shown). Between the burner deck 4 and the burner cap 3 a packing 7 is preferably arranged. The burner deck 4 is provided with perforations (not shown) through which the gases to be burned flow from the burner cap into the combustion space 6. In use, the combustion takes place directly on the side of the burner deck 4 facing the heat exchanger 2. The burner deck 4 is preformed such that, in use, it further deforms according to a preselected deformation under the influence of the combustion heat. In the embodiments shown in Figs. 1 and 2, the burner deck will expand, in use, in the direction of the heat exchanger 2. The surface 10 of the heat exchanger 2 against which the burner deck 4 lies is oriented substantially parallel to the side 11 of the burner deck 4 facing away from the burner cap 3. In the example shown, this side 11 facing away from the burner cap 3 is substantially convex. A side 14 of the burner deck 4 facing the burner cap 3 is concave. A side 12 of the burner cap 3 contacting the burner deck 4 is oriented substantially parallel to the side 14 of the burner deck 4 facing the burner cap 3. The burner deck 4 is preferably provided with a protective, in particular an insulating top layer 13. This top lay-

er 13 comprises a heat-sensitive material to increase the life of the burner deck 4. The material often also has a relatively low coefficient of heat conduction, so that, in use, relatively little produced heat can be lost as a result of heat delivery to the burner deck 4.

[0024] As stated, the burner housing 1 comprises the heat exchanger 2 and the burner cap 3. The burner cap 3 may be arranged separately in the burner housing 1. In a special embodiment not shown, the burner housing is made as a casting. It will be clear that in that case the manufacture of an assembly 1 comprises the following steps: a) the manufacture of a burner housing, by means of one or more casting processes, comprising at least a heat exchanger 2 and a burner cap 3; and b) the mounting of a burner deck 4 in the burner housing.

[0025] An alternative embodiment is shown in Fig. 2. In this case, the burner cap 3 is provided with at least two spatially separated dowel pins designed as hooks 8A, 8B, which are arranged to position the burner deck 4 on the burner cap 3 by means of openings 9A, 9B provided in the burner deck 4. In mounting, the burner deck 4 is therefore placed on the burner cap 3 such that the hook 8A extends through the opening 9A and the hook 8B extends through the opening 9B. In use, the preformed burner deck is straightened a little so that the opening 9A fits around the top 21A of the hook 8A and the opening 9B fits around the top 21B of the hook 8B. When the burner deck 4 is bent back into the preformed position, the opening 9A will better contact the part of the hook 8A located near the burner deck 4, and the opening 9B will better contact the part of the hook 8B located near the burner deck 4. Moreover, the burner deck 4 is thus clamped on the burner cap. The hooks 8A, 8B are preferably cast integral with a burner cap 3 made as a casting.

[0026] As stated before, in such an assembly 1, in use, the gas to be burned is premixed with air before it flows into the combustion space 6 through the perforations (not shown) in the burner deck 4. These perforations (not shown), too, could be used to fix the burner deck 4 to the burner cap by means of the hooks 8A, 8B. It will be clear that in this case, too, the manufacture of an assembly 1 comprises the following steps: a) the manufacture of a burner housing 1 by means of one or more casting processes, which comprises at least a heat exchanger 2 and a burner cap 3; and b) the mounting of a burner deck 4 in the burner housing on the burner cap 3.

[0027] The invention is by no means limited to the exemplary embodiments shown. Thus, the burner deck 4 may also be slid into a previously provided slot in the burner cap 3. Here, too, the burner deck 4 may be clamped on the burner cap 3. The direction of this clamping may be both in the plane of the burner deck 4 and perpendicular to the plane of the burner deck 4. It is also possible that the ends of the burner deck 4 are clampingly bent around at least an outwardly extending lip on the burner cap 3. To ensure a still more rapid

mounting, the packing 7 may be provided on the burner deck 4 already during the manufacture of the burner deck 4. The mounting method may be extended by all kinds of steps, including, for instance, the arrangement of a packing 7. The heat exchanger 2 may, for that matter, also be manufactured according to a method in which no use is made of a casting. A heat exchanger 2 may, for instance, also be manufactured from plate material.

[0028] Such variants are all considered to fall within the scope of the invention.

Claims

1. An assembly of a burner and a burner housing, in which the burner housing comprises a heat exchanger and a burner cap and the burner comprises at least a burner deck, the burner deck being mountable in the burner housing such that the burner deck, after mounting, is located substantially between the burner cap and the heat exchanger, the burner deck being manufactured substantially from a perforated plate, which plate is preformed such that, in use, it deforms according to a preselected deformation under the influence of the combustion heat, the burner deck being enclosed within the burner housing. 5
2. An assembly according to claim 1, in which the burner deck is fixed on the burner cap by means of at least one dowel pin. 10
3. An assembly according to claim 1 or 2, in which the burner cap is provided with at least two spatially separated dowel pins designed as hooks, which are arranged to extend through openings provided in the burner deck, for fixation of the burner deck on the burner cap. 15
4. An assembly according to any one of the preceding claims, in which the heat exchanger comprises a heat-exchanging surface located opposite the burner deck, which surface is oriented substantially parallel to the side of the burner deck facing away from the burner cap. 20
5. An assembly according to any one of the preceding claims, in which a side of the burner cap contacting the burner deck is oriented substantially parallel to the side of the burner deck facing the burner cap. 25
6. An assembly according to any one of the preceding claims, in which between the burner deck and the burner cap and/or between the burner deck and the heat exchanger a packing can be arranged. 30
7. An assembly according to any one of the preceding claims, in which the burner deck is substantially convex, in particular double-bent, on a side facing away from the burner cap. 35
8. An assembly according to any one of the preceding claims, in which the burner deck is substantially concave on a side facing the burner cap. 40
9. An assembly according to any one of the preceding claims, in which the burner deck is provided with a protective, in particular an insulating top layer. 45
10. An assembly according to any one of the preceding claims, in which the burner housing is at least partly, preferably largely, and in particular entirely made as a casting. 50
11. A burner housing intended for use in an assembly according to any one of the preceding claims, in which the burner housing comprises a heat exchanger and a burner cap. 55
12. A burner deck intended for use in an assembly according to any one of claims 1-10, in which the burner deck is manufactured substantially from a perforated plate, which plate is preformed such that, in use, it deforms according to a preselected deformation under the influence of the combustion heat.
13. A method for manufacturing an assembly according to claim 10, in which the method comprises at least the following steps: a) the manufacture of a burner housing according to claim 11 by means of one or more casting processes; b) the mounting of a burner according to claim 12 on the burner cap in the burner housing.

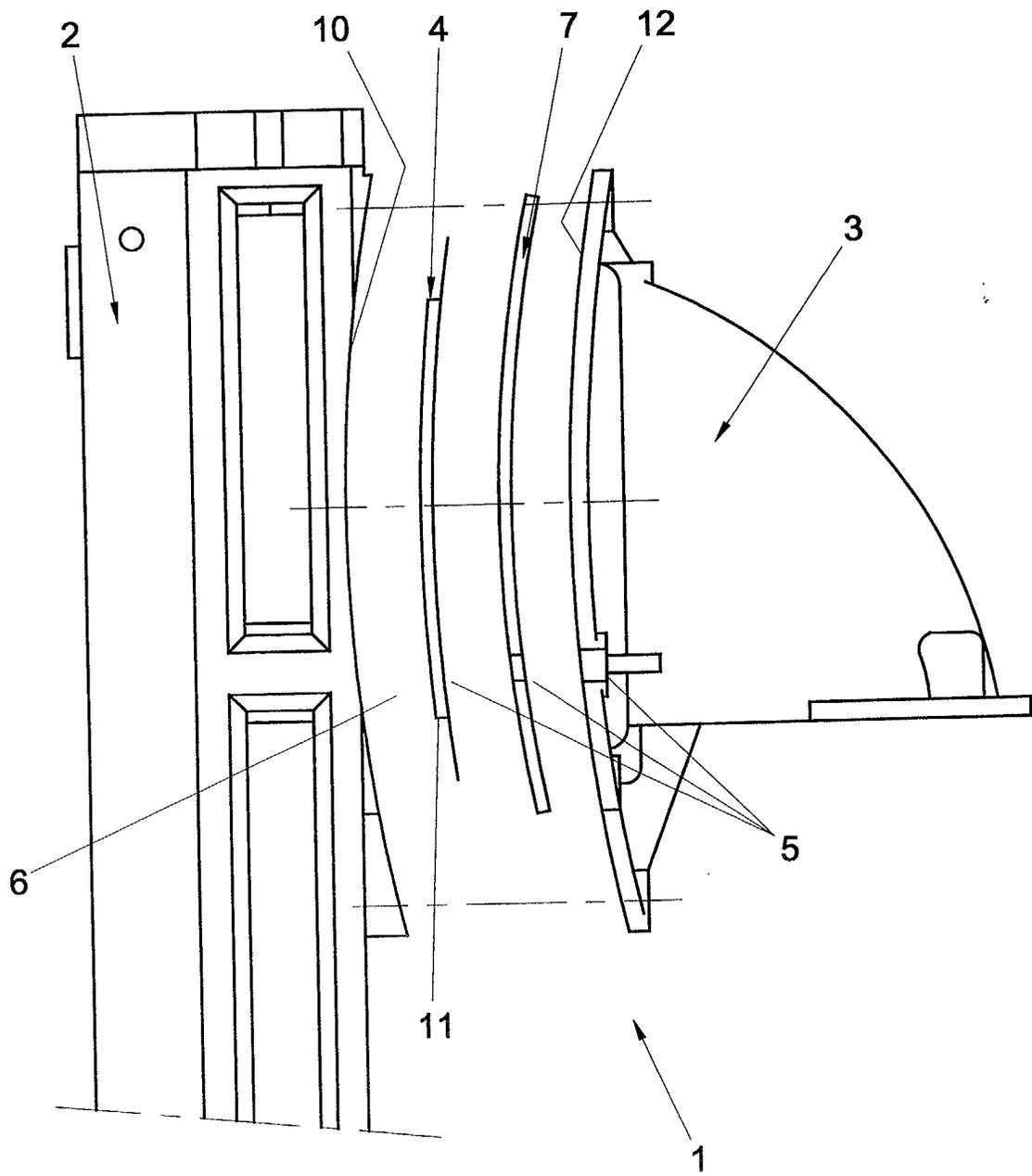


FIG. 1

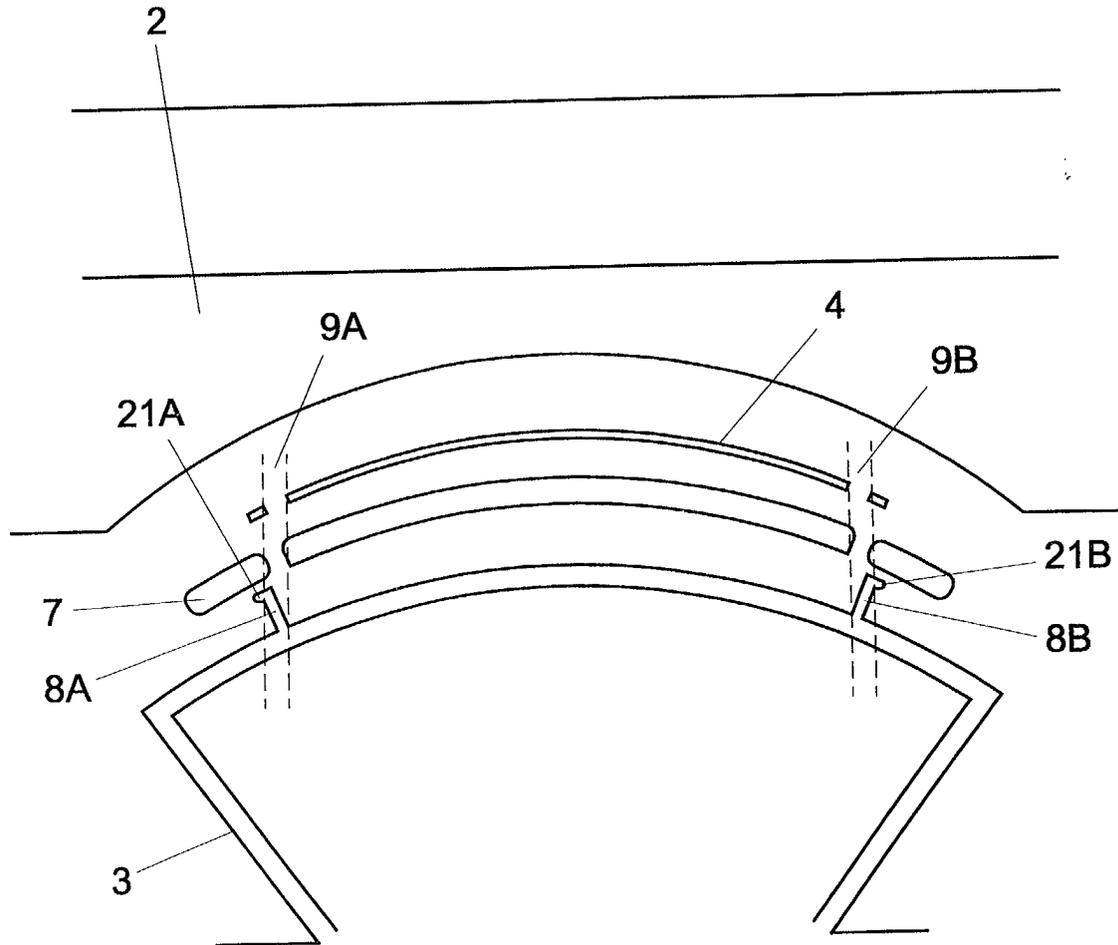


FIG. 2



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 07 6856

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Place of search THE HAGUE		Date of completion of the search 10 July 2002	Examiner Mougey, M
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EPO FORM 1503 03 82 (P04C01)



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EUROPEAN SEARCH REPORT

Application Number
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<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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