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(54) **Improved expansion vessel for wall-mounted boiler**

(57) An expansion vessel for gas wall-mounted boiler, for example a condensing boiler (1), is placed within a boiler structure containing a burner, a mixing organ (6) wherein the gas arrives and connected to a fan (5) which sends such gas and said air to a duct (4) connected to the burner (3), said expansion vessel having a body (12) having a plurality of walls (16, 17, 18, 19, 20, 21) delimiting an inner compartment, a pair (20, 21) of such walls having a larger surface than the remaining walls of the above-mentioned body (12). A wall (20) of such pair of walls (20, 21) has at least a concavity (25; 25A, 25B), said wall (20) receding into the inner compartment towards the other wall (21) of such pair at such concavity (25; 25A, 25B).

iting an inner compartment, a pair (20, 21) of such walls having a larger surface than the remaining walls of the above-mentioned body (12). A wall (20) of such pair of walls (20, 21) has at least a concavity (25; 25A, 25B), said wall (20) receding into the inner compartment towards the other wall (21) of such pair at such concavity (25; 25A, 25B).

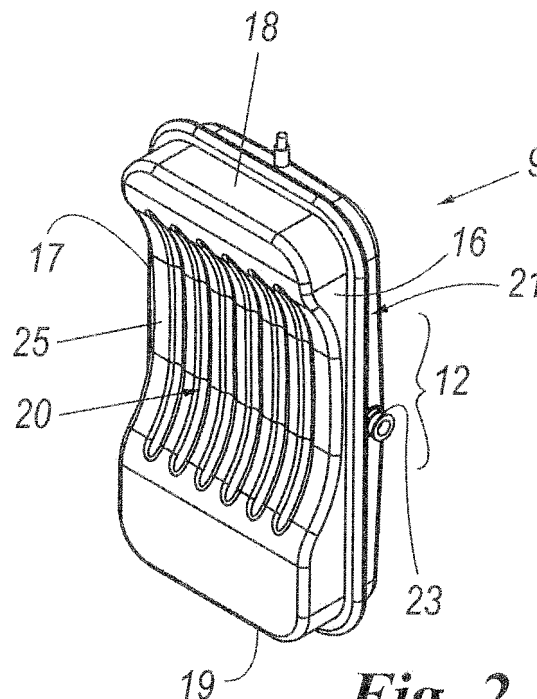


Fig. 2

Description

[0001] The object of the present invention is a silencer for gas wall-mounted boiler, for example a condensing boiler, according to the preamble of the main claim.

[0002] As it is known, a gas wall-mounted boiler comprises a structure containing a burner thereat a mixture of gas and air arrives through a duct connected to a fan. The latter is functionally associated to a mixing organ or member thereat the gas and the combustion air arrive. In the structure, generally on a burner side, there is an expansion vessel connected to the heating circuit apt to compensate the increase in the water volume due to its temperature variation.

[0003] In the last years, the gas condensing boilers have become ever more used also in the light of their high efficiency.

[0004] It is also known that the boilers' sizes are becoming ever more important in houses, even in the light of inserting such boilers in domestic environments (for example kitchen furniture or containment technical recesses inside or outside the house) with reduced sizes. In order to reduce the sizes of such boilers, one intervenes on their inner components by reducing the sizes thereof so as to reduce the whole sizes of the boilers themselves.

[0005] The object of the present invention is to offer an improved expansion vessel for a gas wall-mounted boiler apt to allow a reduction of the whole sizes of the latter.

[0006] In particular, the object of the invention is to offer an expansion vessel of the mentioned type allowing the correct positioning of the other components of the burner within the structure of the latter.

[0007] Another object is to offer an expansion vessel of the mentioned type having a high mechanical resistance to the deformation.

[0008] These and other objects which will be evident to the person skilled in the art are achieved by an expansion vessel according the enclosed claims.

[0009] For a better understanding of the present invention, the following drawings are enclosed simply by way of example, but not for limitative purposes, wherein:

figure 1 shows a front view of a condensing boiler without front wall for better clarity and equipped with an expansion vessel according to the invention;
figure 2 shows a perspective view of the expansion vessel shown in figure 1;
figure 3 shows a side view of what shown in figure 2;
figure 4 shows a front view of the expansion vessel of figure 1; and
figure 5 shows a view similar to that of figure 1, but comprising a variant of the expansion vessel according to the invention shown in such figure 1.

[0010] By referring to the mentioned figures, figure 1 shows a gas wall-mounted, for example condensing, boiler

er 1 comprising a structure or outer casing 2, wherein a burner 3 is placed thereat a mixture of air and gas arrive through a mixing duct 4. The latter is connected to a valve 5, in turn connected to a mixing organ or member 6, known in itself, connected to a gas duct 7. On a side of the burner 3 and of the duct 4 within the casing 2 an expansion vessel 9 is provided, with function known in itself, connected to the heating circuit of a house wherein such boiler operates.

[0011] According to the invention, the expansion vessel 9 comprises a box-like body 12 having peripheral walls 16 and 17, an upper wall 18, a lower wall 19 and a pair of front and rear walls 20 and 21 having larger surface extensions than those of the other above-mentioned walls 16 to 19. The body 12 is equipped with usual member 23 connecting to the heating circuit thereto the boiler 1 is connected and it comprises a duct 24 connected to such member 23. The above-mentioned walls delimitate an inner compartment of the expansion vessel 9 wherein a (not shown) usual membrane is placed.

[0012] According to the invention, the front wall 20 of the body 2 has at least a partly concave concavity 25, said wall 20 thus receding into the inner compartment of the box-like body 12 of the vessel 9 towards the rear wall 21 of the latter. The wall 21 can be fully flat or slightly rounded or convex (as in figures), projecting towards the structure or casing 2 of the boiler.

[0013] In this way, in such casing a space is created (the lacking portion in the concave wall 20 of the box-like body 12) wherein it is possible housing partially or fully some structural components of the boiler (such as, in figure 1, the mixing duct 4 and the mixing organ 6). These components, then, approach to a side wall 2A of the outer casing 2 of the boiler (proximate to the vessel 9) more than they approach within a known boiler without an expansion vessel not according to the present invention. This allows reducing the sizes in width L (figure 1) of the boiler.

[0014] Considering that the expansion vessel 9 is subject to a pressure variation from 0.5 to 2.5 bar, such vessel has to guarantee a resistance to size deformation during operation. Therefore, advantageously the front wall 20 is equipped with bosses or stiffening ribs 28 along the whole concave surface thereof.

[0015] Thanks to such solution the not deformity of the expansion vessel 9 during operation is guaranteed so that:

- the vessel 9 is not subjected to "fatigue" so as to guarantee its function in time (coupling of its inner membrane to the outer members - sheet shells - of the vessel);
- the sizes of the vessel 9 during operation remain within the design tolerances so as not to interfere with the other boiler components;
- the sizes of this component during operation remain within the design tolerations so that all mechanical fixing members and the hydraulic connections there-

to it is subjected within the boiler are not subjected to "fatigue stress".

[0016] In figure 5, wherein portions corresponding to those already described in relation to the other figures are designated with the same reference numerals, the expansion vessel 9 has the front wall 20 equipped with two hollowed portions 25A, 25B wherein boiler components (the fan 6 and a gas valve 30 on the side thereof an electronic circuit controlling the boiler 31 is schematically shown) partially position. Also with such variant a width reduction of the boiler 1 is obtained.

[0017] Two embodiments of the invention have been described. However, still other embodiments are possible (such as, for example, the one wherein the vessel 9 has three or more hollowed portions wherein functional members of the boiler partially position); also such variants are to be considered to fall within the scope of the following claims.

Claims

1. An expansion vessel for gas wall-mounted boiler, for example a condensing boiler (1) located within a boiler structure containing a burner, a mixing member (6) wherein the gas arrives and connected to a fan (5) which sends such gas and said air to a duct (4) connected to the burner (3), said expansion vessel having a body (12) having a plurality of walls (16, 17, 18, 19, 20, 21) delimiting an inner compartment, a pair (20, 21) of such walls having a larger surface than the remaining walls of the above-mentioned body (12), **characterized in that** a wall (20) of such pair of walls (20, 21) has at least a concavity (25; 25A, 25B), said wall (20) receding into the inner compartment towards the other wall (21) of such pair at such concavity (25; 25A, 25B).
2. The expansion vessel according to claim 1, **characterized in that** the wall (20) provided with concavities (25; 25A, 25B) is faced towards functional components (4, 6, 30) of the boiler such as a fan (6), a gas valve (30) or similar, said components being at least partially located within the corresponding concavity (25; 25A, 25B) of the above-mentioned wall (20).
3. The expansion vessel according to claim 1, **characterized in that** the wall (20) provided with concavities (25; 25A, 25B) has bosses or stiffening ribs (28), at least at such concavity.
4. The expansion vessel according to claim 1 **characterized in that** the wall (21) opposite to the one (20) provided with concavities (25; 25A, 25B) is plane.
5. The expansion vessel according to claim 1, **characterized in that** the wall (21) opposite to the one (20) provided with concavities (25; 25A, 25B) is rounded or convex and it projects towards the structure or casing (2) of the boiler.
6. The expansion vessel according to claim 1, **characterized in that** there are two or more concave portions (25A, 25B) faced towards functional components (4, 6, 30) of the boiler.

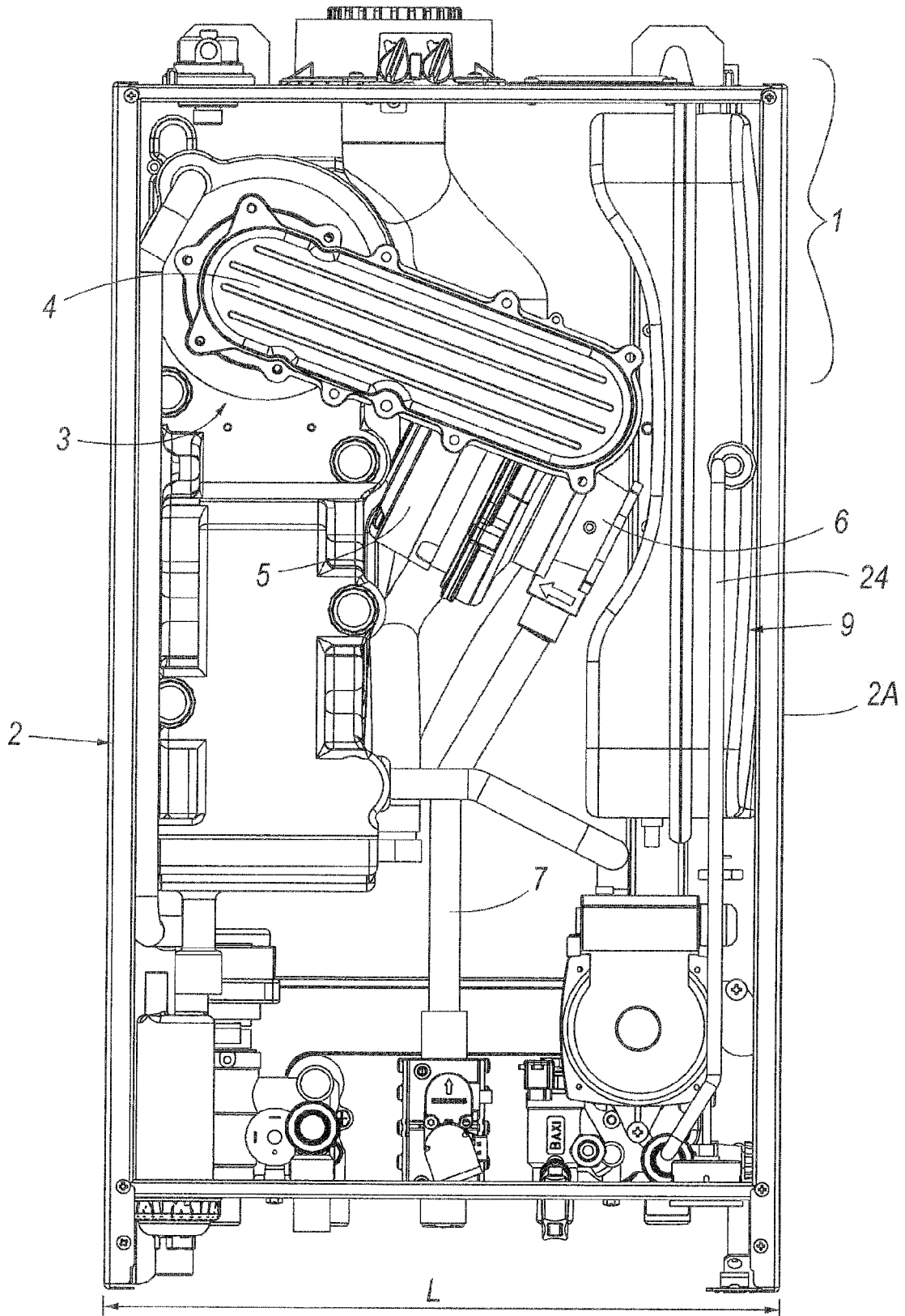


Fig. 1

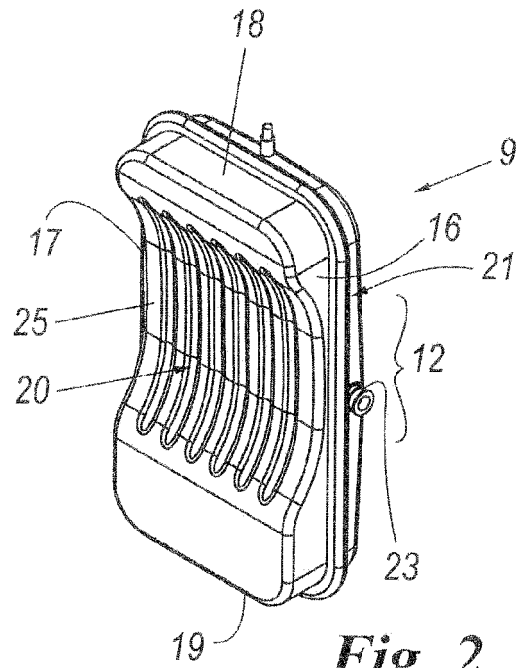


Fig. 2

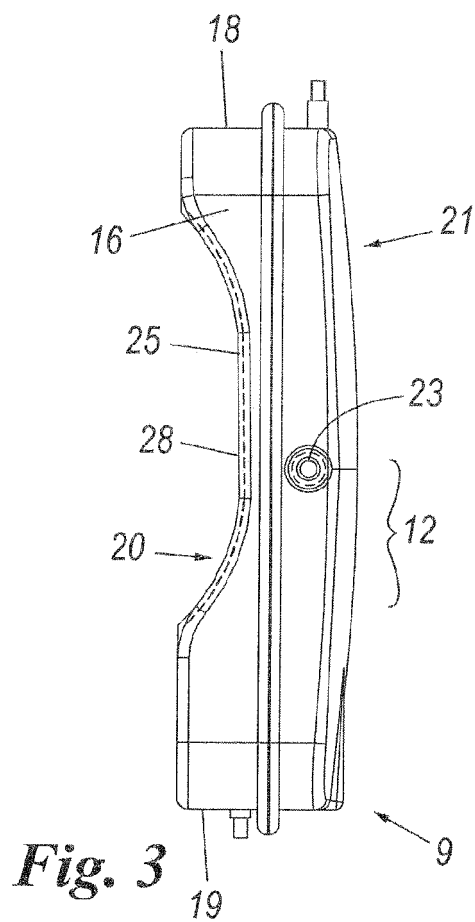


Fig. 3

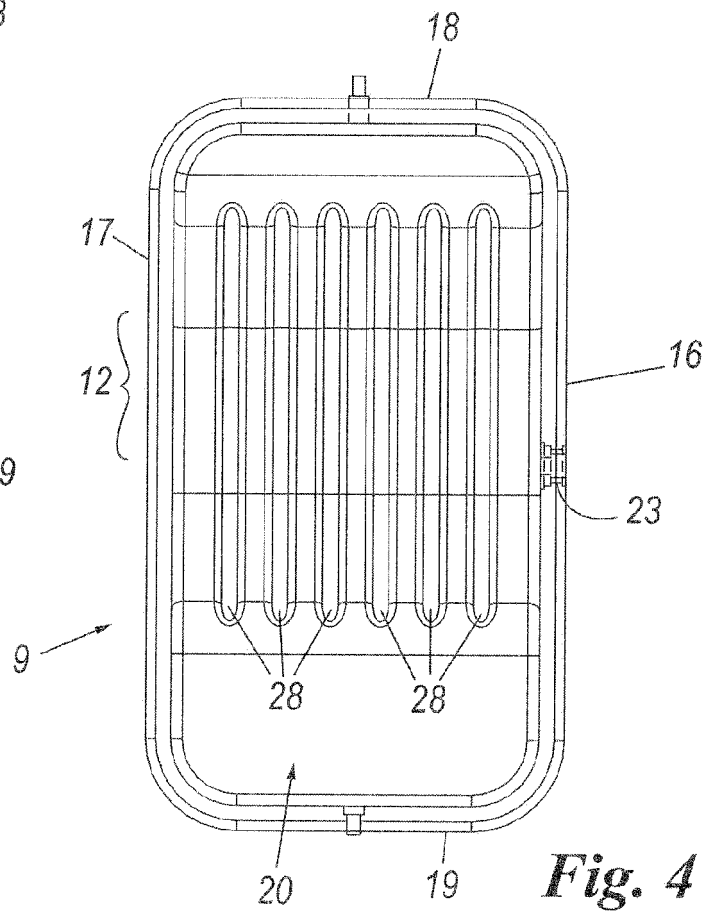


Fig. 4

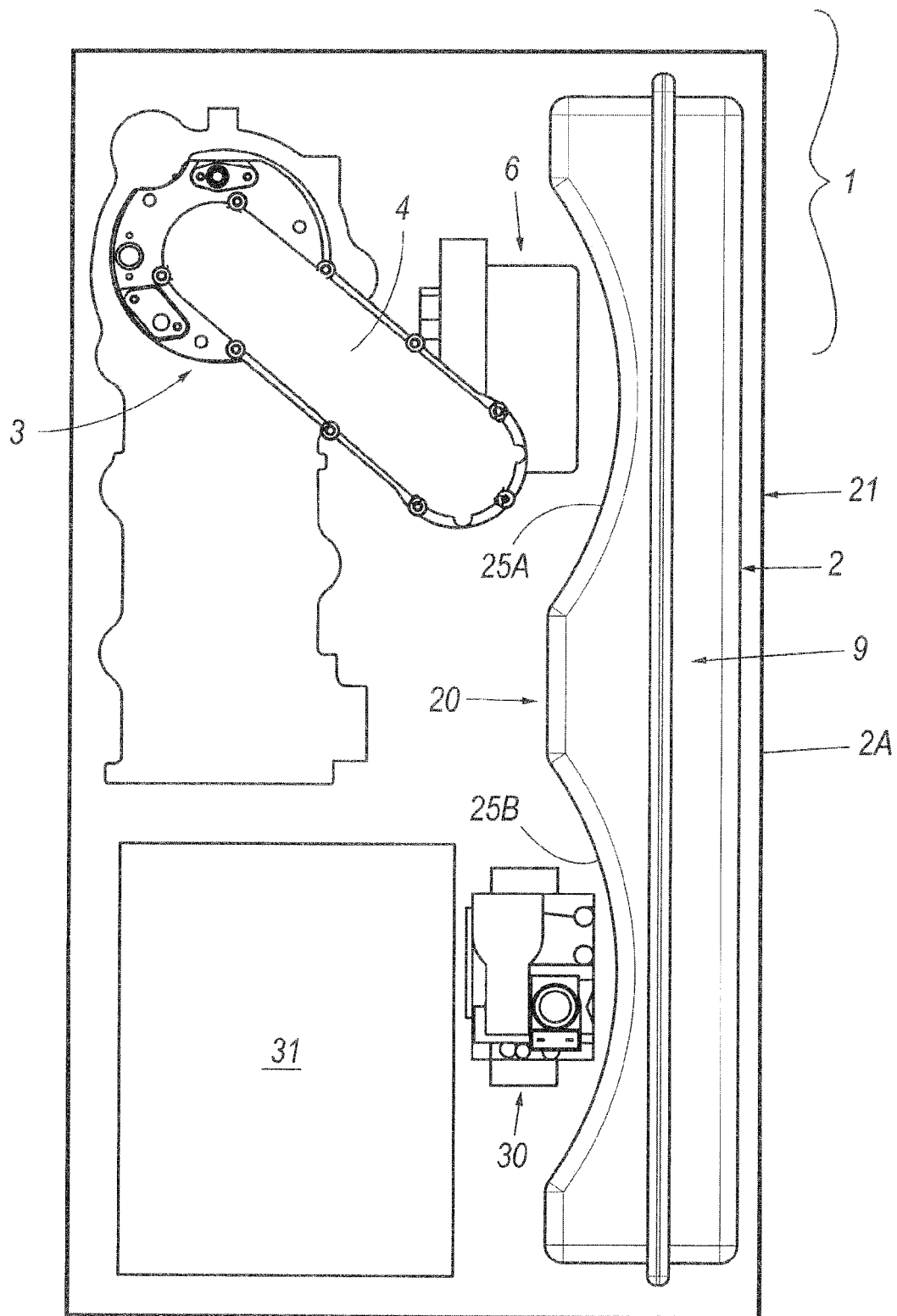


Fig. 5