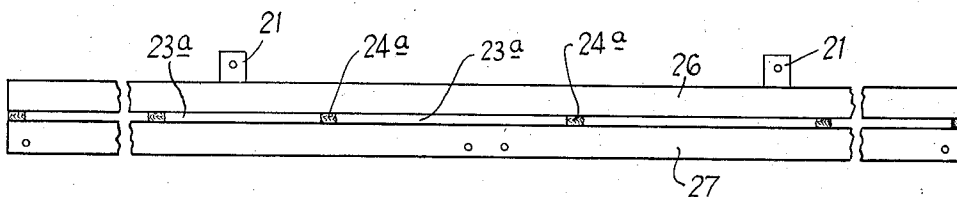
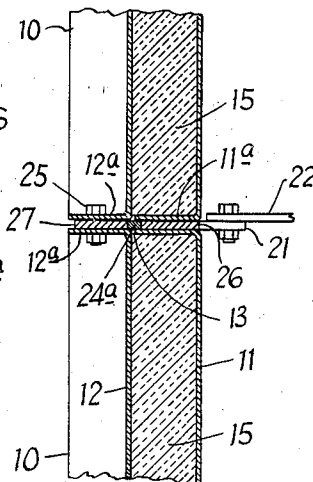
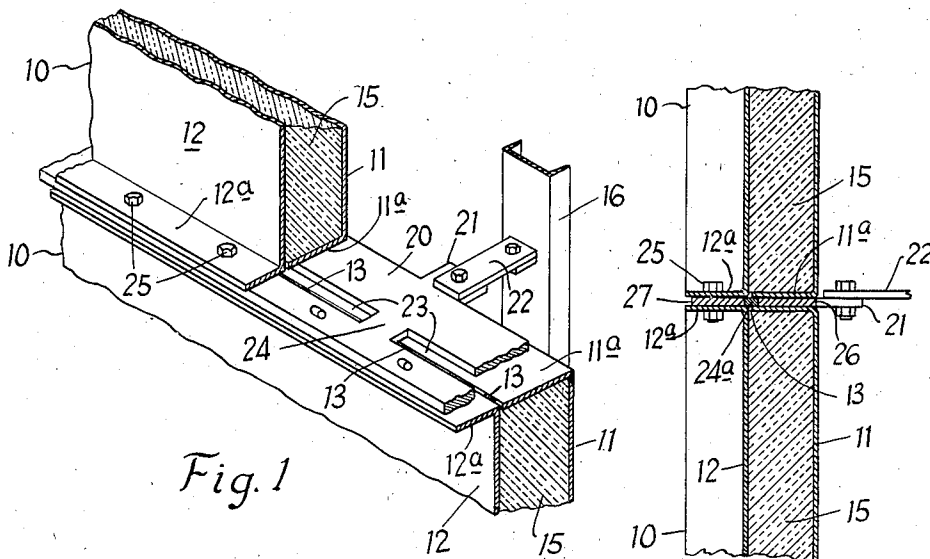


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FLUID HEATER CASING
Filed Feb. 18, 1943

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FLUID HEATER CASING

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8 Claims. (Cl. 189—34)

The present invention relates in general to the construction of gas-tight fluid heater casings adapted to enclose a space containing a gaseous fluid under pressure, and more particularly, to a sectional casing construction for a marine steam boiler within which air for combustion purposes is circulated under a relatively high pressure.

The main object of my invention is the provision of a fluid heater casing of the character described which is characterized by its relatively high structural strength, gas tightness, and low heat loss by conduction. A further and more specific object is the provision of a gas-tight structural joint for a fluid heater casing, including a supporting structural member constructed to substantially reduce the heat flow from the inner to the outer side of the joint without any material change in the strength of the supporting member.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawing and descriptive matter in which I have illustrated and described preferred embodiments of my invention.

Of the drawing:

Fig. 1 is a perspective view, partly broken away and in section, of a marine steam boiler casing constructed in accordance with my invention;

Fig. 2 is a vertical section of a sectional casing joint illustrating a modified form of my invention; and

Fig. 3 is a plan view of the structural supporting member shown in Fig. 2.

In the drawing I have illustrated my invention as employed in the construction of a steam boiler sectional casing of the general type illustrated in U. S. Patent No. 2,251,014 for enclosing a space through which air for the fuel burners is circulated under a relatively high pressure. In Fig. 1 I have shown the boiler casing as formed by a plurality of sections 10, each of which consists of two dished inner and outer panels 11 and 12 of thin sheet metal, such as #10 gage sheet steel. The panels 11, 12 preferably have similar boundary dimensions with their edge flanges 11^a and 12^a respectively facing outwardly and slightly spaced apart. The panels are held in this arrangement, while minimizing the outward heat flow from the inner flange 11^a to the outer flange 12^a, by tack welds 13 at spaced points along their length. The

space between the panels is packed with a suitable heat insulating material 15, such as uncalcined diatomaceous earth.

Adjacent casing sections 10 are assembled by suitably connecting the adjoining outer flanges 12^a to provide a gas-tight joint therebetween. When the length of the connected flanges is long or the gas pressure within the casing relatively high, it is necessary to provide a structural load carrying member connecting the casing sections 10 to an inner structural member or casing 16. If the usual type of structural supporting member is placed between the edge flanges of adjoining casing sections, it would form an excellent heat conductor through the casing, nullifying the insulating effect of the heat insulating material 15 and tack welded flange construction and tending to overheat the outer flanges 12^a.

In accordance with my invention, a structural supporting member is arranged between the edge flanges of adjoining casing sections 10 and specially shaped to maintain a gas-tight joint while minimizing the amount of heat conducted through the structural member to the outer side of the casing. In the construction shown in Fig. 1, the structural supporting member is in the form of a flat plate or bar 20 positioned between and substantially coextensive with the flanges 11^a and 12^a. Tabs 21 project inwardly at spaced points along the inner edge of the bar 20 for connecting the bar 20 to the inner casing or structural support 16 through tie bars 22. The bar 20 has elongated slots 23 above the adjacent edges of the flanges 11^a and 12^a and particularly the tack welded portions thereof except for narrow short connecting neck portions 24 at spaced points. The cut away portions are thus confined to the region of the neutral axis of the bar 20, and accordingly have only a slight reducing effect on the strength of the bar. The bar is tightly secured along its outer edge portion to the outer edge flanges 12^a by bolt connections 25 to form a gas-tight joint between the casing sections. Brass sheathed asbestos packing strips can be used between the bar 20 and the outer edge flanges 12^a to minimize gas leakage. The heat flow through the neck portions 24 is quite low and of substantially the same order as through the insulated panel portions. The slots 23 form in effect heat traps at the corresponding portions of the joint, while reducing the amount of material required for the supporting member.

In the modification shown in Figs. 2 and 3, the structural supporting member for the edge flange joint is formed by parallel inner and outer bars

26 and 27 respectively having connecting neck portions 24^a formed by fusion welding the bars 26 and 27 together at spaced points, forming in effect slotted portions 23^a along the neutral axis of the composite bar. The bar construction and arrangement are otherwise similar to that of Fig. 1.

While in accordance with the provisions of the statutes I have illustrated and described herein the best forms of the invention now known to me, those skilled in the art will understand that changes may be made in the form of the apparatus disclosed without departing from the spirit of the invention covered by my claims, and that certain features of my invention may sometimes be used to advantage without a corresponding use of other features.

I claim:

1. A fluid heater casing comprising a plurality of heat insulated casing sections, each having inner and outer spaced apart sheet metal panels and heat insulating material in the space between said panels, and a structural supporting member arranged between adjoining sections, said supporting member having slots extending substantially along and occupying a major portion of its length and forming spaced connecting neck portions between said sections to minimize the heat flow through said supporting member.

2. A fluid heater casing comprising a plurality of heat insulated casing sections, each having inner and outer spaced apart sheet metal panels and heat insulating material in the space between said panels, and a structural supporting member arranged between adjoining sections and connected thereto to form a gas-tight joint therebetween, said supporting member having slots extending substantially along its neutral axis and forming spaced connecting neck portions between said sections to minimize the heat flow through said supporting member.

3. A fluid heater casing comprising a plurality of heat insulated casing sections, each having inner and outer sheet metal panels with spaced apart out-turned edge flanges and heat insulating material in the space between said panels, and a flat structural supporting member arranged between the edge flanges of adjoining sections, said supporting member having slots extending along its length and forming spaced connecting neck portions between said sections to minimize the heat flow through said supporting member.

4. A fluid heater casing comprising a plurality of heat insulated casing sections, each having inner and outer sheet metal panels with spaced apart out-turned edge flanges connected at spaced points and heat insulating material in the space between said panels, and a flat structural supporting member arranged between the edge flanges of adjoining sections, said supporting member having slots extending substantially along the edges of said connected flanges and forming spaced connecting neck portions between

said sections to minimize the heat flow through said supporting member.

5. A fluid heater casing comprising a plurality of heat insulated casing sections, each having inner and outer sheet metal panels with spaced apart out-turned edge flanges connected at spaced points and heat insulating material in the space between said panels, and a structural supporting member arranged between the edge flanges of adjoining sections and connected to the edge flanges of said outer panels to form a gas-tight joint therebetween, said supporting member having slots extending along the edges of said connected flanges and forming spaced connecting neck portions between said sections to minimize the heat flow through said supporting member.

6. A fluid heater casing comprising a plurality of heat insulated casing sections, each having inner and outer sheet metal panels with spaced apart out-turned edge flanges tack welded together at spaced points and heat insulating material in the space between said panels, and a flat structural supporting member horizontally arranged between the horizontal edge flanges of adjoining sections and connected to the horizontal edge flanges of said outer panels to form a gas-tight joint therebetween, said supporting member having slots extending substantially along its neutral axis and forming spaced connecting neck portions between said sections to minimize the heat flow through said supporting member.

7. A fluid heater casing comprising a plurality of heat insulated casing sections, each having inner and outer sheet metal panels with spaced apart out-turned edge flanges connected at spaced points and heat insulating material in the space between said panels, a structural supporting member arranged between the edge flanges of adjoining sections, said supporting member having slots extending along the edges of said connected flanges and forming spaced connecting neck portions between said sections to minimize the heat flow through said supporting member, an inner support, and means for connecting the inner side of said supporting member to said support.

8. A fluid heater comprising a plurality of heat insulated casing sections, each having inner and outer sheet metal panels with spaced apart out-turned edge flanges tack welded together at spaced points and heat insulating material in the space between said panels, a flat structural supporting member horizontally arranged between the edge flanges of adjoining sections and connected to the edge flanges of said outer panels to form a gas-tight joint therebetween, said supporting member having slots extending substantially along its neutral axis and forming spaced connecting neck portions between said sections to minimize the heat flow through said supporting member, an inner support, and means for connecting the inner side of said supporting member to said support.

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