Nov. 2, 1943. K. L. VELANDER 2,333,497

BOILER

Filed April 16, 1941

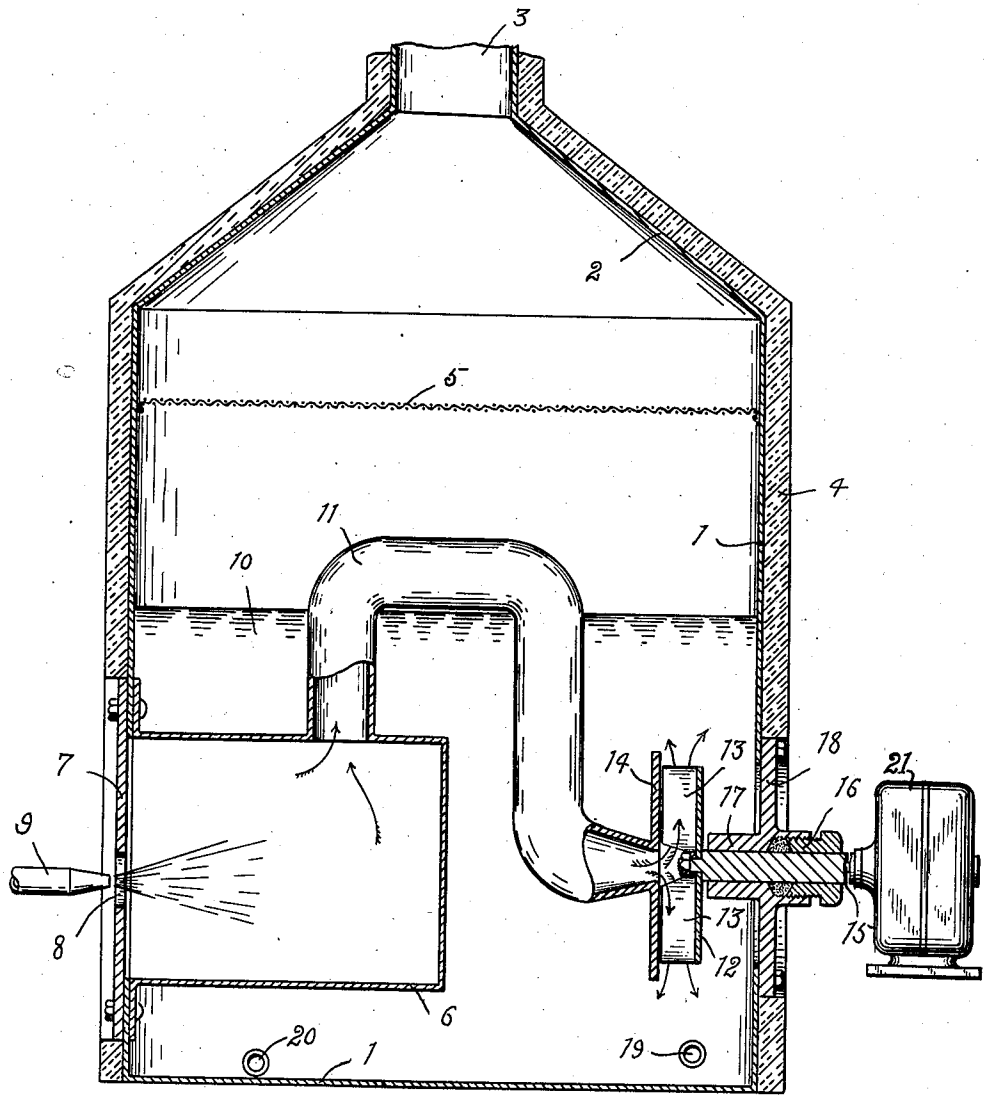


Fig. 1.

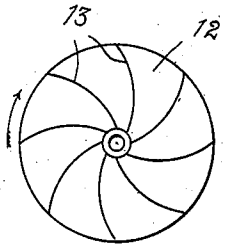


Fig. 2.

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BOILER

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3 Claims. (Cl. 60—45)

This invention relates to a means for generating mixtures of steam and gases by internal combustion, and has for its principal object the provision of a boiler having means for the generation of heat therein by internal combustion and wherein practically all of the heat units generated and contained within the products of combustion are available for converting the water in the boiler into steam.

It is a further object of the invention to provide a means wherein the combustion chamber is almost entirely submerged within the water of the boiler so that some of the heat may pass into the water through the combustion chamber walls and the remainder be drawn mechanically therefrom and forced to traverse the water in its course to the steam outlet.

It is consequently a further object of the invention to provide a means for drawing the products of combustion from the combustion chamber and forcing it through the water of the boiler to the steam.

Other objects and advantages of the invention will appear in the following description thereof.

Referring now to the accompanying drawing, forming part of this application, and wherein like reference characters indicate like parts:

Figure 1 is a central vertical section through a steam generating boiler embodying my invention.

Figure 2 is a plan view of the rotor of the pump.

Referring now in detail to the drawing, the numeral 1 designates the boiler shell which is provided with an annular crown 2 of somewhat conical form in order to communicate with the steam outlet indicated at 3, and which may be of any desired size commensurate with the steam service required. This entire structure is preferably covered with a suitable fireproof insulating material which is indicated at 4 and designed to prevent the escape of any heat units therethrough.

Since in this type of boiler, wherein the products of combustion are drawn from the combustion chamber and forced through the water in the boiler, there is considerable agitation in the water, I have provided a screen, indicated at 5, transverse the boiler, and positioned somewhat above the normal level of the water therein, to break the bubbles and foaming of said water during operation of the device.

The combustion chamber of the boiler is indicated at 6 and may be of any desired shape and is approximately proportioned as indicated with the rest of the boiler, and is closed excepting at its open forward end which is flanged and secured as by suitable bolts to the boiler shell. The boiler shell is cut-away to conform to the interior cross-sectional dimensions of the combustion chamber and is closed by the combustion chamber closure 7 removably attached to the boiler shell by bolts as indicated, or otherwise. A small axial opening 8 is provided through the closure 7 into which is axially installed the discharge end of the fuel nozzle 9 which may inject furnace oil or gas or other accepted and suitable fuel for the furnace into the combustion chamber.

Some of the heat generated by the burning of the fuel, as is obvious, will pass through the shell of the combustion chamber 6 directly into the water, which is indicated at 10. The greater portion of said heat units, however, will be drawn through the outlet 11 of the combustion chamber by and to the rotor indicated at 12, provided with the arcuately disposed vanes 13, the rotation of which will force, by centrifugal action, said heat units and products of combustion into and through the water and out through the steam outlet 3, at very low pressure. The end of the outlet 11, adjacent the rotor is somewhat reduced in size and provided with a disc-like flange 14 spaced slightly from the edges of the vanes 13 of the rotor 12. The rotor is mounted upon the shaft 15 which may be driven by any suitable motor, suggested at 21, externally of the boiler, and a packing nut and gland 16 is installed about the rotor shaft to prevent the escape of water thereabouts; the bearing for said shaft being indicated at 17 which is provided with a flange 18 for bolting attachment to the boiler casing.

A return pipe is indicated at 19, providing means for the return of any condensation to the boiler, and at 20 is provided any form of draining means for the boiler so that the same may be drained if and when necessary.

It is to be understood that the normal water level in the boiler is below that of the horizontal portion of the pipe 11 to insure against water being conducted backwardly into the combustion chamber during the time the pump is idle, and that upon the initial operation of the pump any water within the outlet 11 will be drawn therefrom by the rotor.

It is found that the action of this centrifugal pump provides exceptionally even distribution of the heat and products of combustion into and through the water of the boiler and provides suf-

ficient pressure for efficient conduct of the steam and vapor to the radiators to be heated.

From the foregoing, it is apparent that there is no possibility whatever for the heat to escape, and that all of the heat units are trapped in the water as well as all soluble gases, and that the rotor causes a turbulence in the boiler water which results in the steam and vapor more readily forming and rising to the steam-vapor outlet.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. An internal combustion steam-vapor generator comprising a boiler casing having a steam-vapor outlet and adapted to hold a quantity of water, a combustion chamber submerged within said water, means for supplying combustible material to said combustion chamber, an outlet from said combustion chamber, said outlet having an open end submerged within said water, a rotor having panes adjacent said open end and within said water for drawing the products of combustion therefrom and forcing same into and through said water to said steam-vapor outlet.

2. An internal combustion steam-vapor generator comprising a boiler casing having a steam-vapor outlet and adapted to hold a quantity of water, a combustion chamber, means for supplying combustible material to said combustion chamber, an outlet from said combustion chamber, said outlet having an open end submerged within said water, a rotor having vanes adjacent said open end and within said water associated with said combustion chamber for drawing the products of combustion therefrom and forcing same into and through the water to said steam-vapor outlet.

3. An internal combustion steam-vapor generator comprising a boiler casing adapted to hold a quantity of water and having a constricted top terminating in a steam-vapor outlet, a screen in said boiler casing above the normal water level therein adapted to prevent water cast up by ebullitions in the boiler passing through the steam-vapor outlet, a combustion chamber submerged within said water, means for injecting combustible material to said combustion chamber, an outlet extending upwardly from said combustion chamber to above the water level in said boiler casing and downwardly therein to form a trap and terminating below the water level, and terminating in an open end submerged in said water, a rotor having vanes within said water adjacent the open end of the outlet of said combustion chamber and adapted to draw the products of combustion therefrom and force the same into and through the water to said steam-vapor outlet.

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