May 30, 1950 E. M. MARTIN 2,509,690

TANK HEATER

Filed Aug. 7, 1946

Fig. 1

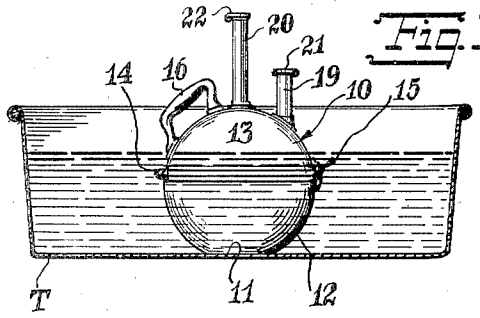


Fig. 3

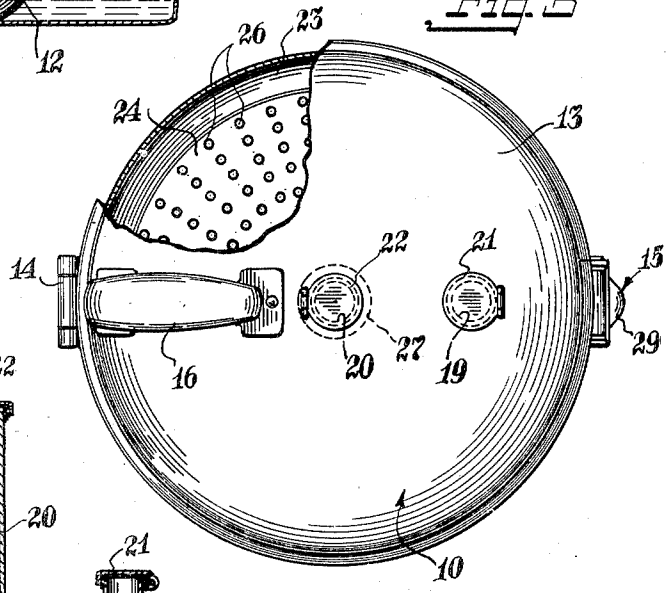


Fig. 2

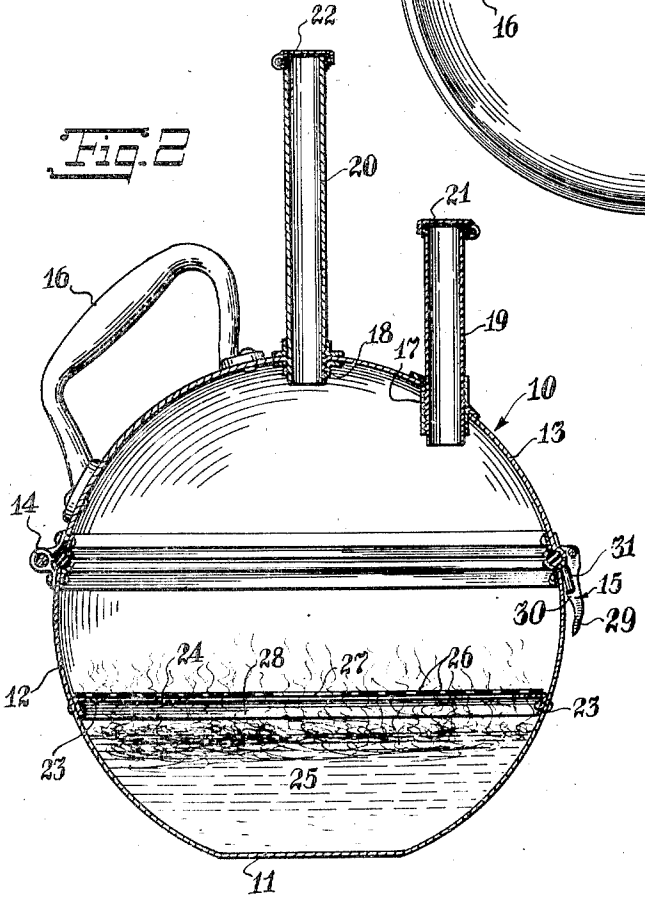
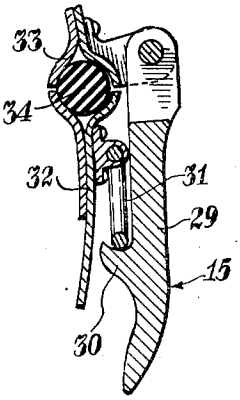


Fig. 4



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TANK HEATER

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2 Claims. (Cl. 126—360)

1

My invention relates to a device which may be immersed into a tank for heating its contents, as, for instance, a bathtub filled with water.

The general object of my invention is to provide a tank heater which is simple in construction, requires a minimum of servicing, and may be held in continuous readiness for repeated operation.

A more specific object of my invention is to provide a tank heater adapted for liquid fuel, particularly though not exclusively for combustible liquids of heavy consistency. A fuel of the latter type is known, for instance, under the trade name of "Sterno."

Additional features and objects will subsequently appear.

In the drawing accompanying this specification:

Fig. 1 is a view of a tank heater according to the invention;

Fig. 2 is a sectional elevation of the heater on a larger scale;

Fig. 3 is a top view of the heater shown in Fig. 3, with part of the cover broken away;

Fig. 4 is an enlarged view of the closure member.

In accordance with my invention, I provide a preferably spherical heater 10 which, as shown in Fig. 1, may be immersed into a pan or tank T forming no part of the invention. The body of the heater may have a flat portion 11 to rest on the bottom of the tank, or legs (not shown) may be provided for this purpose. The spherical shape affords a maximum heating surface with a given amount of material and, therefore, a given weight. Thus the heater may be built in fairly large proportions without becoming too inconvenient to handle or transport.

The body of the heater is made in two parts, a lower shell 12 and an upper shell or cover 13. The cover may be secured to the shell 12 in any convenient way, as by a hinge 14 and a closure member or clamp 15. A handle 16, preferably of heat insulating material, may serve as a convenient means for raising the cover 13 as well as for removing the device from the tank.

The cover 13 is provided with two nipples 17 and 18 designed to receive the threaded ends of tubes 19 and 20, respectively. Tube 19 is topped by a pivoted lid 21 and tube 20 by a similar lid 22. Tube 19 represents the air intake pipe and tube 20 the exhaust duct for the fumes. A certain control of the combustion process may be obtained by adjusting the depth to which the tubes are screwed into the respective nipples.

Resting on brackets 23 secured to a diametrically reduced portion of shell 12 is the perforated

2

screen 24 which divides the inside of the sphere into a lower and an upper compartment. The lower compartment contains the fuel 25 and may be termed the combustion chamber whereas the upper compartment serves primarily as an air reservoir. The screen 24 is provided with a number of perforations 26 and may also have a central hole 27 of larger diameter, opposite the outlet of tube 20. The fuel may be ignited by dropping a lighted match through the tube 20. It is well known that all the heavy fuel oils from kerosene down will quench a lighted match when it is thrown into the oil. To light such oils, therefore, in the present heater, the heater is tilted until some oil gets on screen 24 whereupon a lighted match is thrown upon this screen. The match will then ignite the small amount of oil on the screen and will not be quenched. As this small flame begins to burn it will draw more and more fumes from the oil below. These fumes will come up through the holes 26 in screen 24 and will burn like jets on top of the screen. The screen thus has a flame spreading and compressing action which promotes efficient and even heating. The latter hole may also conveniently serve for the removal of screen 24 from shell 12.

An initial clearance 28 should be maintained between the fuel level and the screen 24 if the flame is expected to remain close to the surface of the liquid; on the other hand, where the combustion of the fuel depends primarily on the development of inflammable gases the flame will rise through the perforations 26 and spread over the upper surface of the screen. With fuels of the latter type it may even be advisable to omit the hole 27 inasmuch as the presence of the lighted match above screen 24 should be sufficient to ignite the vapors.

A possible construction of the clamp 15 is shown in Fig. 4. There, a pivoted handle 29 is shown bearing with its cam portion 30 against a pivoted ring 31, thereby forcing the lips 32 and 33 of body portions 12 and 13 to exert pressure upon the packing member 34 which may be an annular rubber gasket of circular cross section. Other quick-acting latching devices may be substituted for the one shown in the drawing or the members 12 and 13 may be threaded into one another, with omission of hinge 14.

The absolute and relative lengths of the stacks 19 and 20 will generally vary according to the prevailing conditions, such as the dimensions of the vessel to be heated. If desired, tube 19 may be placed at an angle to tube 20 and may likewise project radially from the cover 13.

The mode of operation of my heater follows from its construction. When the fuel is lit, combustion products in the form of smoke will gather around the highest point of the sphere and will find a ready outlet there by way of tube 20. On the other hand, colder air from the surrounding atmosphere will enter the shell 13 at a lower point through tube 19 and feed the flame through perforations 26. It should be noted that the outlet of tube 19 ought to be sufficiently high above the screen 24 to provide a substantially uniform distribution of the air supply over the surface thereof. To extinguish the flame without waiting for exhaustion of the fuel, it is merely necessary to close lids 21 and 22 on tubes 19 and 20. It will be seen that the latch 15 need only be opened for purposes of cleaning and refuelling.

While I have described a specific embodiment of my invention, it is to be understood that departures may be readily made therefrom without exceeding the spirit and scope of the invention as defined in the appended claims.

I claim:

1. A submersible tank heater of the character described comprising in combination, a spherical shell divided horizontally somewhat above the equator into two parts, the upper part being hinged to the lower at one point with an intervening gasketed pressure joint; a latching mechanism whereby said upper part may be quickly opened or locked in a tight position; a pair of air intake and exhaust tubes having hinged lids and being mounted vertically upon said upper hinged part of said spherical shell, the air intake tube being somewhat shorter than the exhaust tube, and a perforated screen mounted inside the lower part of said spherical shell about half way down in same, said screen dividing off a lower chamber with access only through said perforations through said screen.

2. A submersible tank heater of the character described comprising in combination, a spherical, thin-walled metallic shell divided horizontally somewhat above the equator into two parts, the upper part being hinged to the lower part at one point, both adjoining edges of the upper and lower parts having a circular groove with a flexible gasket; a lever-operated latching mechanism placed opposite said hinge whereby said upper part may be quickly opened and locked in a tight position; air intake and exhaust tubes mounted vertically upon said hinged upper part of said spherical shell, and a perforated screen removably mounted inside the lower part of said spherical shell about half way down in same, said screen dividing off a lower chamber with access only through said perforations through said screen.

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