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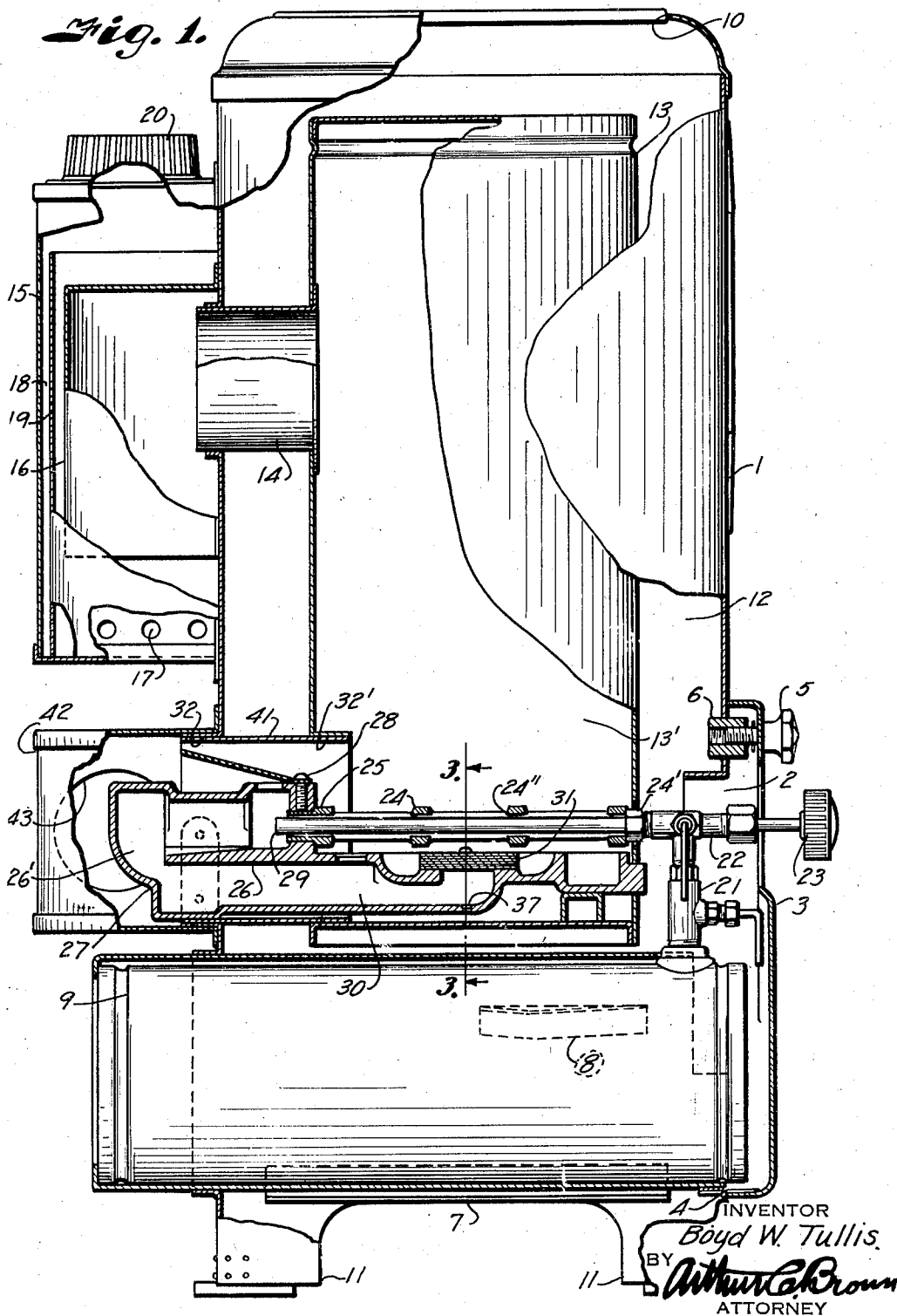
B. W. TULLIS

2,128,171

CIRCULATING HEATER

Filed June 3, 1937

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

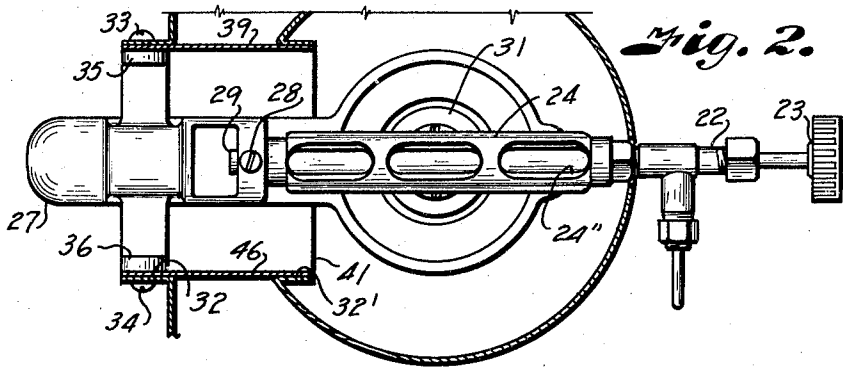


Fig. 2.

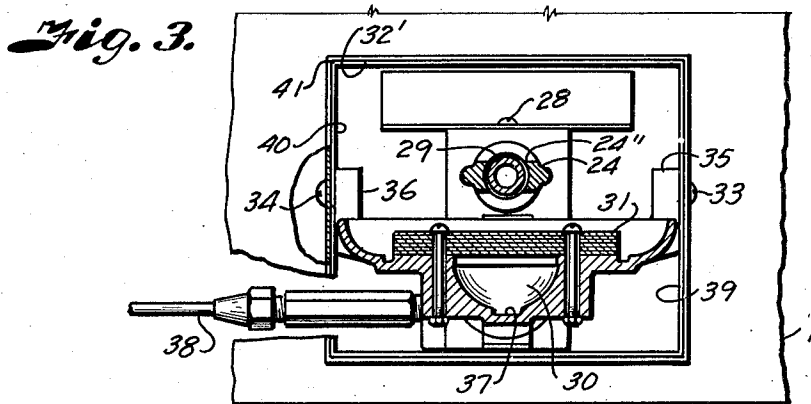


Fig. 3.

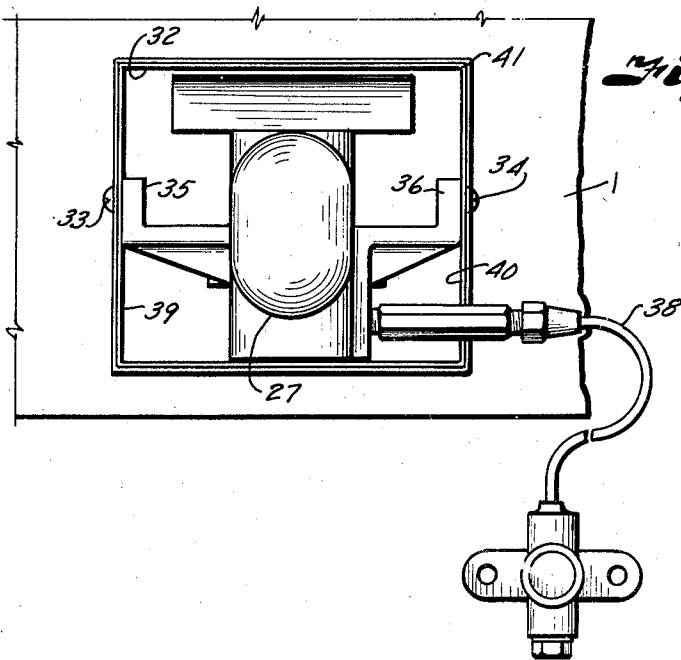


Fig. 4.

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CIRCULATING HEATER

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8 Claims. (Cl. 126—95)

This invention relates to circulating heaters and it is particularly designed to be used in so called trailers although it is not necessarily limited to that particular use. The primary object of the invention is to provide a heater in which a liquid fuel burning device is employed and the invention contemplates the provision of means for compactly associating the various parts and rendering certain parts easily accessible for assembly and removal as occasion demands.

The novelty of the invention will be understood by reference to the following description in connection with the accompanying drawings in which

Figure 1 is a view partly in side elevation and partly in section of a complete heater constructed in accordance with my invention, certain parts being broken away to better illustrate other parts.

Figure 2 is a plan view of the burner and the vaporizing generator associated therewith.

Figure 3 is a cross sectional view on the line 3—3 of Figure 1, the upper part of the casing being broken away, and

Figure 4 is a rear view of a part of the heater casing showing the end of the removable burner unit.

Referring now to the drawings by numerals of reference, 1 designates a heater casing having an opening 2 at its lower front portion, normally closed by a door 3 hinged at 4 and fastened to the heater casing by a threaded knob 5 which engages an internally threaded socket 6 in the casing. In the bottom of the main casing 1 is a tank guide 7 provided with springs 8 so that when a tank 9 is received in the guide the springs will serve as cushions to prevent rattling of the tank in the guide. The heater casing is provided with openings 10 at its top so that air passing around the tank guide will flow up through the heater casing and through the openings 10. It will be observed that the casing 1 is supported upon legs 11 so that the air can readily flow around the guide up through the space 12 between the casing and a heating drum 13, the latter being supported within the casing in any appropriate manner. The bottom and top of the heating drum 13 are closed to form a combustion chamber 13' having outlet near the upper end of the heating drum through an offtake collar 14 which discharges into a flue 15. The flue is provided with a baffle 16 so that products of combustion passing from the heating drum into the flue 15 will not directly contact the flue and thereby heat it to such a degree that the paint or finish will be burned. The lower end of the

flue is provided with air intake openings 17 which discharge into a space 18 between a cylindrical baffle 19 and the flue so that the outer portion of the flue will be additionally cooled. The upper end of the flue is provided with a thimble 20 to which a smoke pipe may be conveniently attached. The fuel tank 9 is provided with the usual filler plug and it may be provided with a built in pump, not shown, so that fuel may be put under air pressure but since fuel tanks with filler plugs and built in pumps are old and well known in the art, no view illustrating these is shown. The tank carries a discharge pipe 21 which supports a vaporizing generator 22, superposed above the tank and located longitudinally thereof, the vaporizing generator 22 being of known construction the fuel being controlled by the valve 23 in a well known manner. The vaporizing generator extends into a tubular guide 24 which has its rear end 25 loosely connected to a bunsen 26 of a burner 27. The guide is held in position by a screw 28. The guide has slight lateral play at its front end within an opening 24' of the drum 13 so that the vaporizing generator can be readily seated therein when the tank is shoved in place. The discharge end 29 of the generator discharges into the bunsen in the usual way. The burner has a hollow portion 30 which connects with the bunsen through a passageway 26' and discharges into a burner cap or member 31 which is located immediately below the guide and vaporizing generator so as to heat the generator to vaporizing temperature as well as to supply heat to the heating drum. It will be noted that the guide has cutouts 24'' so that the flame from the burner may play directly upon the generator. It will also be observed that the rear side of the casing and drum are cut away to provide aligning openings 32 and 32' in which are mounted the ends of a sleeve-like housing 41 that encloses the bunsen 26 and through which the burner may be introduced, the burner being held in place therein by screws 33 and 34 which extend through the sides 39 and 40 of the sleeve-like housing to engage in arms 35 and 36 of the burner. Therefore the burner may be removed as a unit, including the bunsen the burner cap and the guide. This is an important feature of the invention because by constructing the device so the entire burner assembly may be readily removed and applied the parts are rendered easily accessible for inspection and repairs as well as for assembly. The burner passageway is provided with a cup shaped portion 37 which accumulates condensed fuel and

will permit it to be drained off through pipe 38 (Fig. 3).

Fixed to the back of the stove, in covering relation with the opening 32, is a box-like structure 42 that cooperates with the sleeve-like housing 5 to enclose the bunsen and the rear portion of the burner, and which is provided with an air inlet 43 wherethrough combustion supporting air is admitted to the opening 32 of the combustion 10 chamber and for supplying the bunsen 26. The box-like structure is of substantially larger capacity than the opening 43 so that it forms a muffler to quiet the suction of the air being delivered to the bunsen.

It will be observed from the foregoing that the tank and generator assembly may be easily introduced into the outer casing through the door opening 2 upon opening the door 3. The generator will easily pass through the opening 24' and engage the guide since the guide has enough play to permit the generator to set itself. In operating the heater constructed and assembled as described, with the generator and tank assembly in position, pressure is generated in the tank 9 by operating the pump (not shown), so as to force a liquid to the vaporizing generator upon opening of the valve 23. Liquid fuel will be discharged through the generator and may be ignited by lighting the burner 31 to effect heating of the generator. As the generator heats up the fuel begins to vaporize into a gas which is discharged from the generator into the bunsen. This action draws air through the opening 43 of the box-like structure 42 and through the sleeve-like housing 41 to the bunsen for mixture with the gas. The fuel mixture then passes through the hollow portion of the burner 30 and burns about the cap 31. Secondary air is also drawn through the opening 43 and through the sleeve-like housing 41 into the combustion chamber. The products of combustion pass upwardly within the drum 13 and are discharged through the collar 14 to the flue. This movement of the products of combustion also draws air through the opening 17 to form a check draft and to prevent burning of the finish on the flue 15. As the drum heats air begins to circulate through the space between the legs 11 and over the sides of the tank 9 for flow in heat exchange relation with the drum, the heated air flowing out through the top opening 10 of the outer casing. This flow of air through the bottom of the heater prevents overheating of the fuel tank.

From the foregoing it is obvious that a stove constructed and assembled as described is especially compact and well adapted for service in heating small, confined spaces, such as automobile trailers.

What I claim is:

1. A circulating heater including a casing having a tank insert opening, a heating drum within the casing, a burner supported in the heating drum, a tank guide located below the drum in alignment with said opening, a tank removably supported in said guide, and a vaporizing generator connected with the tank and having a discharge end arranged to deliver vapor into the burner, said tank and generator being insertable through said opening.

2. A circulating heater including a casing, a fuel tank guide in the bottom of the casing, a fuel tank removably supported in said guide, a fuel vaporizing generator connected with the fuel tank, a burner in the casing adapted to be served by said generator, and a door in the front of the

casing whereby the tank including said generator is removable from the casing upon opening of said door.

3. A circulating heater including a casing, a fuel tank guide at the bottom of the casing, a heating drum supported within the casing above said guide in spaced relation with the walls of the casing forming a combustion chamber, a duct extending from said drum through a wall of the casing and forming an air inlet for said chamber, a burner in the combustion chamber, a fuel tank removably supported in said guide, and a vaporizing generator communicating with and rigidly carried by the fuel tank and having an outlet discharging into the burner.

4. A circulating heater including a casing, a fuel tank guide at the bottom of the casing, a heating drum above said guide forming a combustion chamber, a duct extending from said drum through the wall of the casing and forming an air inlet for said chamber, a burner in the combustion chamber, a fuel tank removably supported in said guide, a vaporizing generator communicating with and rigidly carried by the fuel tank, the generator having an outlet discharging into the burner, and a box-like structure connected with the casing in covering relation with said duct and having an opening to atmosphere whereby said box-like structure constitutes a muffler for quieting the rush of air passing through said duct.

5. A circulating heater including a casing having an opening in its front wall and an aligning opening in the rear wall, a fuel tank guide in line with a portion of the opening in the front wall, a heating drum above the guide having a duct connected with the opening in the rear wall, a burner insertable into the heating drum through the opening in the rear wall, a muffler covering said opening in the rear wall and having an inlet from atmosphere, a fuel tank in said guide and removable through the opening in the front wall, a vaporizing generator having connection with the burner, and means rigidly connecting the vaporizing generator with the tank whereby the vaporizing generator is removable with the tank through said front opening.

6. A circulating heater including a casing having an opening in its front wall and an aligning opening in the rear wall, a fuel tank guide in line with the portion of the opening in the front wall, a heating drum above the guide having a duct connected with the opening in the rear wall, a burner insertable into the heating drum through the opening in the rear wall, a muffler covering said opening in the rear wall and having an inlet from atmosphere, a fuel tank in said guide and removable through the opening in the front wall, a vaporizing generator having connection with the burner, means rigidly connecting the vaporizing generator with the tank whereby the vaporizing generator is removable with the tank through said front opening, a door for the opening in the front wall, and means rigidly securing the door to the front wall of the casing for holding the tank rigidly within the guide.

7. A circulating heater including a casing having a top opening, oppositely positioned side openings and a flue opening, a heating drum spaced from the walls of the casing to form air passageways therebetween and having connection with the flue opening, a duct bridging said space between the heating drum and the casing and having connection with one of said side openings, a burner in the drum having a portion supported

5 in said duct, a fuel tank guide supported in the casing in alignment with the other side opening, tank cushioning means in said guide, a fuel tank insertable in the guide, a vaporizing generator carried by the tank and having removable connection with the burner, and a door carried by the casing for closing the opening in line with the fuel tank guide.

10 8. A heater including a casing, a heating drum in the casing in spaced relation with the walls thereof and having ducts extending through the casing for respectively forming an air inlet and

an outlet for products of combustion, a burner in the casing for heating the drum, a vaporizing generator guide connected with the burner and having an end loosely supported in receiving relation with a vaporizing generator, a fuel tank guide in the casing, a fuel tank insertable in said fuel tank guide, and a vaporizing generator carried by the tank and engageable within the vaporizing generator guide when the tank is moved into said tank guide. 5 10

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