May 9, 1933. J. S. HODGES 1,908,354

ORCHARD HEATER

Filed June 1, 1931

Fig. 2

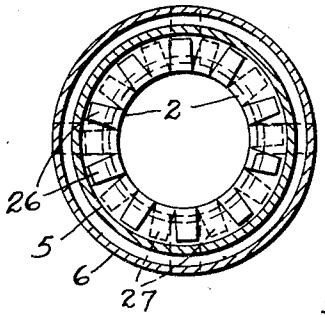

Fig. 3

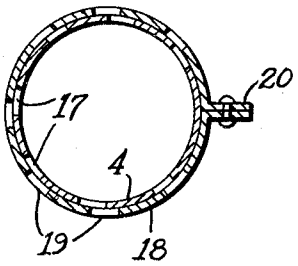

Fig. 1

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UNITED STATES PATENT OFFICE

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ORCHARD HEATER

Application filed June 1, 1931. Serial No. 541,413.

This invention relates to and has for an object the provision in an orchard heater in combination with the usual oil or fuel receptacle, of a detachable combustion chamber having a base constituting a generator and a frusto-conical member adapted to be submerged in the oil of the receptacle, arranged one within the other for directing the heat upwardly to and through a stack which is usually provided on said receptacle.

In the consideration of this invention it may be understood that orchard heaters are usually arranged to burn crude oil, and comprise a base forming a receptacle for the oil and a stack superposed on the base, whereby the products of combustion are discharged from the stack to the atmosphere. In existing types of heaters the combustion is not complete, and therefore unnecessary quantities of smoke and smudge emanate from the heaters during the operation thereof.

It is an object of this invention to provide an orchard heater of simple, economical and effective character which will almost, if not quite completely, eliminate the smoke attendant upon the use of such heaters. This I accomplish by providing in the base of the heater and thruout the superposed portions thereof sufficient radiating surfaces whereby a maximum heat may be generated in the base of the heater for the purpose of volatilizing the fuel and thereafter effecting a complete combustion in and thruout the heater in order that a minimum of smoke or smudge may be discharged into the atmosphere, and a minimum amount of carbon will be deposited on the walls and stack of the heater.

By reason of the complete combustion effected by the use of my heater it will be apparent that the operation of the heater is more economical, a higher degree of heat is obtained, and a substantial economy is effected in the cost of fuel.

Other and more detailed objects of invention may appear as the description progresses.

In the accompanying drawing I have shown a preferred form of my invention which may be modified within the scope of the appended claims without departing from the spirit thereof. In said drawing,

Fig. 1 is a composite elevation of an assembled orchard heater embodying my improvements, partly in section and partly in exterior elevation.

Fig. 2 is a sectional plan of the same on line 2—2 of Fig. 1.

Fig. 3 is a sectional plan on line 3—3 of Fig. 1.

Briefly described, my improvements include a fuel receptacle 1 having a detachable top 2 and a combustion chamber associated with the receptacle and including a generator 3, an intermediate section 4, and inner and outer chimneys or stacks 5 and 6, respectively, superposed on the section 4.

It will be noted that the generator 3 is perforated and is adapted to be seated on the bottom 7 of the receptacle 1 and submerged in a volume of fluid fuel 8, such as crude petroleum. The generator 3 has an enlarged base portion 9 with an inwardly turned flange 10 at the bottom, at which point the generator rests upon the bottom of the receptacle 7. The generator also is provided with a frusto-conical upper portion 11 having a flange 12 underlying the top 2 of the receptacle 1.

A thimble 13 is suitably secured in the opening of the upper portion 11 of the generator, and projects upwardly beyond the flange 12 for a suitable distance so as to telescope into the intermediate section 4 which is detachably fitted onto the thimble or permanently secured thereto, as may be necessary or convenient.

Within the generator 3 I provide a frusto-conical member 14 which is of a substantially smaller diameter than the portion 9 of the generator and has its smaller end seated upon the bottom 7 of the receptacle and its upper and larger end within the conical portion 11, as shown in Fig. 1.

At this point it may be noted that the member 14 is also perforated, as at 15, so that the fluid oil 8 may fill the generator 3 and the member 14 to the same level as in the receptacle 1. The intermediate portion 4 provides an oxygenating zone 16 there-

within to which oxygen is supplied from the atmosphere, preferably thru two series of apertures 17, 17 etc., arranged one above the other and formed in series around the periphery of the member 4.

A pair of dampers 18, 18 are fitted on the exterior of the member 4 and are provided with similar apertures 19, 19 etc., which are adapted to be adjusted to and from registration with the apertures 17, 17 etc. in the member 4, for regulating the amount of oxygen admitted to the zone 16. The dampers 18 may have their extremities 20 bent outwardly as shown in Figs. 1 and 3 on radial lines from the axis of the member 4 so as to provide means whereby the dampers may be rotated on the member 4 for opening and closing the apertures 17 to a desired extent.

The inner chimney 5 and the outer chimney 6 are also of frusto-conical form and gradually decrease in diameter from their lower extremities to their upper extremities. The chimney 5 is substantially spaced from and is concentric with the outer chimney 6. The chimney 5 may be provided with a plurality of perforations, as at 21, for affording communication between the passage 22 in said chimney with the space 23 in the chimney 6, which is externally of the inner chimney. The lower end of the inner chimney has an inwardly turned flange 24 to which a depending collar 25 is attached by bending alternate spaced lugs 26 and 27 over and under the flange 24, respectively.

A plurality of members 28 may be riveted to the collar 25 so as to overlie the upper end of the member 4, whereby the chimneys 5 and 6 may be supported on said member 4. The collar 25 telescopes downwardly into the member 4 and may be frictionally held in position by any suitable means, as for instance a band 29 fixed to the vertical legs of the members 28, or otherwise.

The lower end 30 of the outer chimney 6 is turned inwardly so as to frictionally engage the periphery of the inner chimney 5, and suitable lugs or blocks 31 may be attached to the inner periphery of the outer chimney 6 for frictional engagement with the upper end of the inner chimney 5 for spacing the inner and outer chimneys apart.

In operation, a sufficient quantity of the fluid fuel 8 is placed in the fuel receptacle 1 and the fuel is ignited by any suitable means and initial combustion takes place in the frusto-conical portion 11 of the generator 3, thus serving to heat the entire base of the heater by radiation and to gradually volatilize the fuel not only within the generator 3 but also within the intermediate section 4.

The dampers 18 are adjusted properly for introducing sufficient quantities of oxygen for effecting a more perfect combustion of the gases generated within the heater. Usually the top 2 of the receptacle is perforated so that a draft is readily created above the level of the fluid 8, and the entire area of the heater becomes heated and increases in temperature until a maximum temperature is reached, at which time a substantially complete combustion takes place. As a matter of fact, the burning gases rise thru the section 4 and into the chimneys 5 and 6, and when the chimneys have been traversed the combustible elements have been substantially consumed, and the heat discharged from the outer chimney 6 is substantially smokeless.

The perforations 21 in the inner chimney 5 serve to direct heat into the shallow space 23 so as to radiate heat from the stack 6 into the orchard or zone surrounding the heater. As the level of fuel is decreased to a point below the top of the member 14 within the generator the burning gases are deflected outwardly against the frusto-conical wall 11 of the generator 3 instead of being directed upwardly thru the chimneys and to the atmosphere. Thus, when the fuel level is lowered the combustion zone of the generating flame is centralized and concentrated in but is not necessarily confined to the member 14, and the heat is deflected against portion 11 and thence upwardly thru the stack.

It will be obvious that the walls of the heater from the top of the stack 6 to the bottom of the generator 3 become hotter as combustion continues, and the longer the heater is in operation the more complete the combustion will be.

In other types of heaters it is almost, if not quite, impossible to consume the fluid fuel beyond a depth of two inches or more from the bottom of the receptacle, whereas in my heater with the arrangement shown I am enabled to consume substantially all of the fuel by reason of the form of the generator and the means provided for maintaining an ample draft at all times.

What I claim is:

1. An orchard heater comprising in combination with a fuel receptacle, a perforated generator submerged in the fuel of the receptacle provided with a combustion chamber, and having an inclined top portion, a frusto-conical perforated member centrally mounted within the generator and of lesser height and diameter than said generator, and a stack superposed on the generator and forming a continuation of the combustion chamber.

2. An orchard heater comprising a fuel receptacle, a generator mounted therewithin and provided with a perforated frusto-conical wall with the minor diameter at the top, a stack superposed on said receptacle, said generator being partially submerged in the fuel in said receptacle, the in-

terior of said generator forming a combustion chamber, and a frusto-conical member within the generator for deflecting the heat arising from combustion therein outwardly to the frusto-conical wall of the generator when the fuel level falls below the top of the frusto-conical member.

3. An orchard heater comprising in combination with a fuel receptacle, a generator mounted within said receptacle and submerged in the fuel, provided with a perforated frusto-conical wall, having a minor diameter at the top, a stack at the top of said generator and a perforated frusto-conical member centrally mounted within said generator and having its major diameter at the top for centralizing and concentrating the combustion of fuel therewithin, whereby the heat is directed therefrom against the frusto-conical top portion of said generator and thence into said stack when the fuel level falls below the top of said member.

4. An orchard heater comprising in combination with a fuel receptacle, a generator mounted within said receptacle and submerged in the fuel, provided with a perforated frusto-conical wall, having a minor diameter at the top, a stack at the top of said generator and a perforated frusto-conical member centrally mounted within said generator and having its major diameter at the top for centralizing and concentrating the combustion of fuel therewithin, whereby the heat is directed therefrom against the frusto-conical top portion of said generator and thence into said stack when the fuel level falls below the top of said member, the major diameter of said member being substantially in excess of the minor diameter thereof so as to provide a substantial inclination to the wall of said member, for the purpose described.

5. An orchard heater comprising in combination with a fuel receptacle a generator including a pair of concentrically arranged frusto-conical members mounted within said receptacle and sumberged in the fuel, a stack on the outer member said frusto-conical members being perforated and centrally disposed relative to said stack, whereby the combustion of the fuel therewithin will be concentrated and centralized relative to, and the heat from combustion will be discharged into, said stack.

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