June 14, 1938. L. O. MORIN 2,120,291

ORCHARD HEATER

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Fig. 1

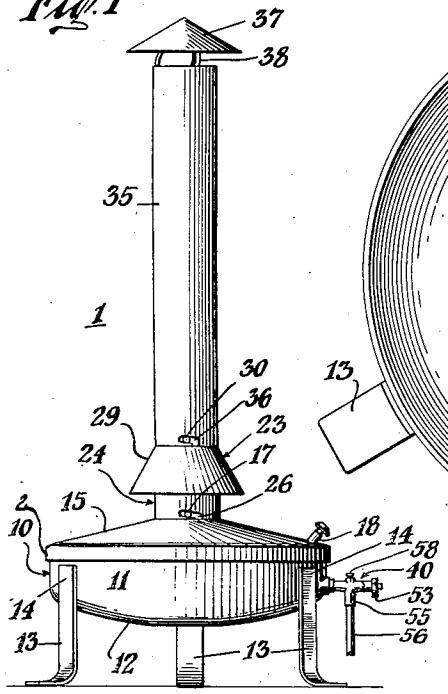


Fig. 3

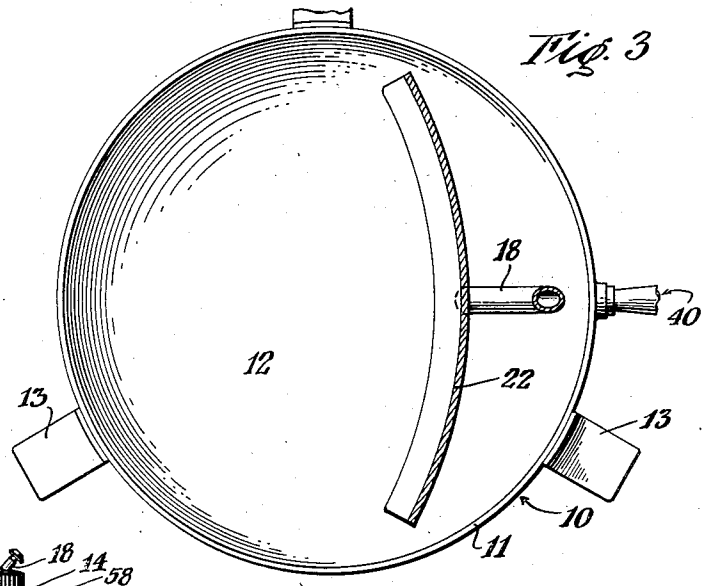


Fig. 2

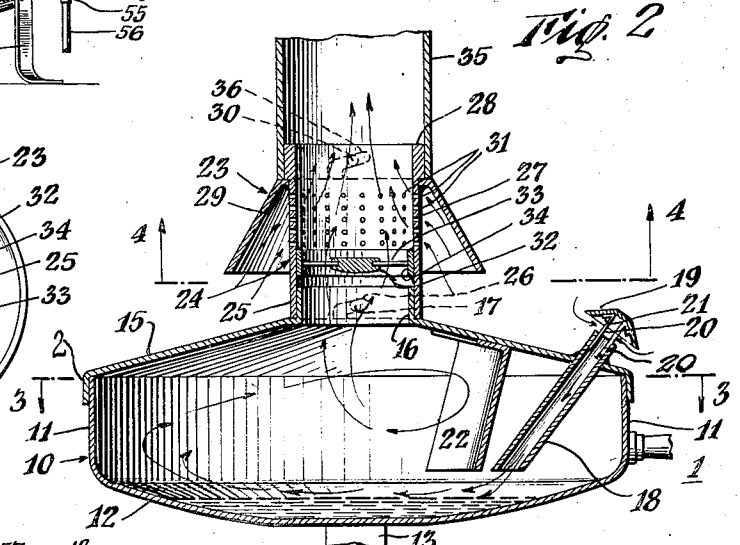


Fig. 4

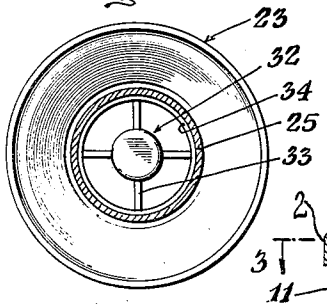


Fig. 5

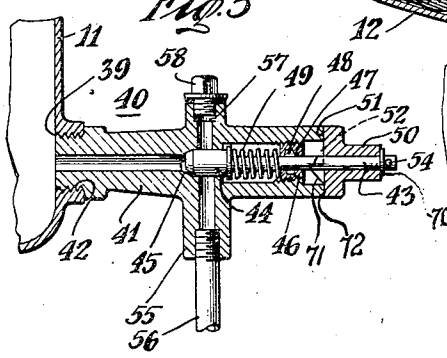
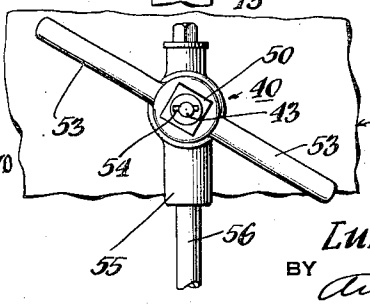


Fig. 6



INVENTOR
Luke O. Morin
BY
Austin & Dix
ATTORNEYS

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ORCHARD HEATER

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Fig. 7

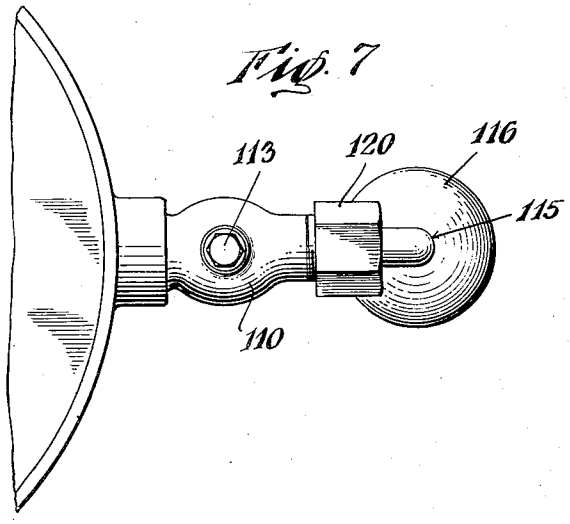


Fig. 9

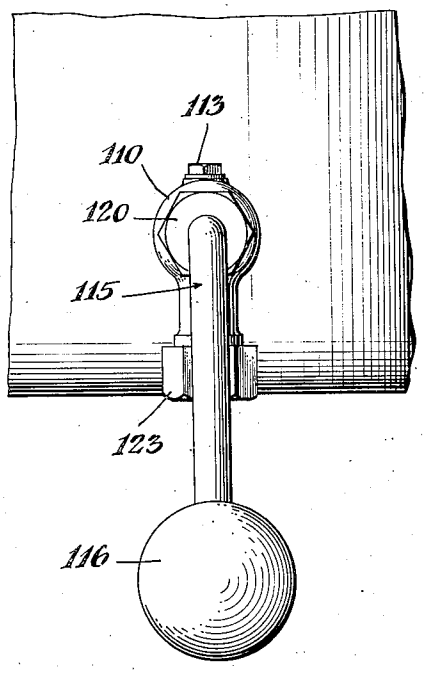
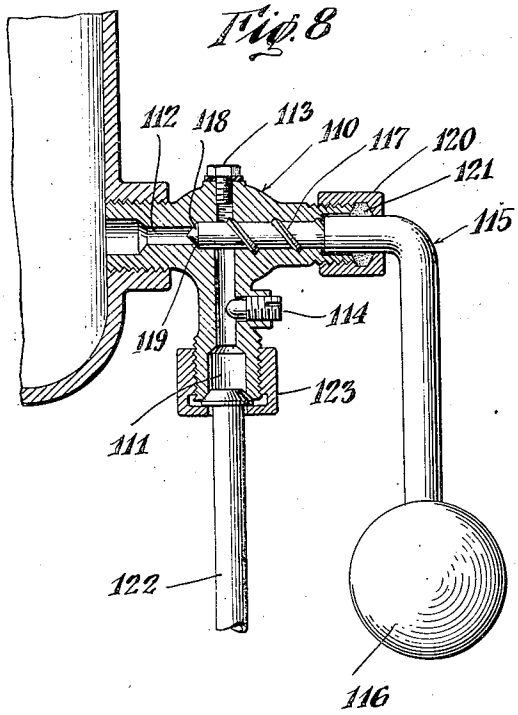


Fig. 8



INVENTOR
Luke O. Morin
BY Austin & Day
ATTORNEYS

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UNITED STATES PATENT OFFICE

2,120,291

ORCHARD HEATER

Luke O. Morin, Chattanooga, Tenn.

Application November 5, 1935, Serial No. 48,303

1 Claim. (Cl. 158—91)

This invention relates generally to heaters for orchards.

More specifically, the invention relates to that type of orchard heater which is portable and uses a liquid hydrocarbon as its source of fuel. From a practical standpoint, to accomplish efficient and consequent effective protection of trees and growing fruit thereon against frost and freezing, such a heater should be capable of burning a cheap or low grade hydrocarbon oil with maximum generation of heat without undue generation of smoke. The practice of using the so-called "smudge pots" has for various reasons become undesirable and has been specifically prohibited by express statute or ordinance in many of the fruit growing communities.

Hence, it is of extreme importance in those communities to have available a device for protection of fruit against frost and freezing which will be effective for that purpose not only with reference to the amount of effective smokeless heat which such device will generate but as well a device which is extremely cheap in construction, yet sturdy and easy to manipulate. The present invention accomplishes the foregoing desirable objects and others which are described more in detail hereinafter.

In accordance with one form of the invention, there is provided a burner receptacle or flash pan into which the liquid fuel is introduced in relatively small quantity through suitable feed lines equipped with a specially constructed regulator valve. Mounted on said flash pan is a cap or cover to which is attached a combustion unit with a flame spreader and suitable hot gas stack. The cap is also provided with a down draft tube and air current baffle which extend into the burner receptacle where the liquid fuel is ignited. The heater may be protected from the wind and weather by suitable guards and the various parts are so designed as to relative sizes and shapes that a maximum effective heat is generated with minimum fuel consumption.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages, and the manner in which it may be carried out, may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part thereof, in which—

Fig. 1 is a side view in elevation of the heater;

Fig. 2 is a fragmentary view in cross-section showing the burner receptacle, its cover and a combustion unit;

Fig. 3 is a fragmentary view on line 3—3 showing the position of the down draft tube and air current baffle;

Fig. 4 is a view on line 4—4 of Fig. 2;

Fig. 5 is a view in cross-section of the feed valve;

Fig. 6 is a view of the valve in elevation with a handle bar affixed to its stem;

Fig. 7 is a top plan view of a modified form of fuel valve;

Fig. 8 is an elevation in cross-section of the modified form of fuel valve; and

Fig. 9 is an end view in elevation of the modified form of valve.

In the following description and in the claims, various details will be identified by specific names for convenience, but they are intended to be as generic in their application as the art will permit.

Like reference characters denote like parts in the several figures of the drawings.

Referring to the drawings, the heater 1 may be constructed in the main of sheet metal or other suitable material. 10 represents the burner receptacle having cylindrical side wall portions 11 and dish shaped bottom 12. The burner receptacle is suitably supported by a plurality of L-shaped legs 13 spot-welded or otherwise fixed to the said receptacle at their upper extremities 14.

Mounted on the burner receptacle 10 is a cover comprising a circular portion 15 in the shape of a truncated cone. Depending from said portion is a cylindrically shaped rim or collar 2 which fits snugly on the side wall portion 11 of the flash pan. Extending upwardly from said truncated cone portion is a cylindrical neck portion 16 provided with an outwardly extending pin 17.

A down draft cylindrical air tube 18 extends through an opening in the cover and is affixed thereto. The down draft tube 18 is provided with an adjustable draft regulator hood 19 which is provided with a plurality of support members 20 spot-welded or otherwise affixed at their extremities 21 to said hood. The opposite ends of said support members frictionally engage the down draft tube in such manner that the space between the hood and tube may be adjusted to regulate the amount of primary air which enters the down draft tube 18.

Spot-welded or otherwise affixed to the cover portion 15 and extending in a general downward direction is an air current baffle 22. This baffle is rounded as indicated more particularly in Fig. 3

and directs the primary air currents in suitable direction through the burner receptacle.

Removably mounted on the flash pan cover is a combustion unit 23. The combustion unit comprises a cylindrically shaped sleeve 24 having a collar portion 25 provided with an angularly shape slot 26 adapted to register with pin 17; a perforated portion 27 and a neck portion 28; and a flared hood 29 fixed at its upper extremity to said sleeve. Collar portion 25 fits snugly about neck portion 16 of the flash pan cover. The neck 28 of the combustion unit is provided with an outwardly extending pin 30.

The perforated portion of the sleeve of the combustion unit is provided with a plurality of secondary air ports 31, the number and size of which are adjusted relative to the size of the flash pan and down draft tube in such manner that substantially perfect combustion is obtained of the fuel being burned in the heater.

Mounted within the sleeve 24 and just below the bottom row of secondary air ports 31 is a flame spreader 32 supported by spider arms 33 fixed at one end to the flame spreader 32 and at the other to a ring 34, fitting snugly within said sleeve and spot-welded or otherwise affixed thereto.

Mounted on the combustion unit 23 is a stack or chimney 35 of generally elongated cylindrical shape and slightly larger in circumference than the combustion unit sleeve 24. The lower extremity of the stack provides a collar which snugly fits about the neck portion 28 of the combustion unit. This collar portion of the chimney or stack is provided with an angular slot 36 which registers with pin 30 extending outwardly from the neck 28.

An adjustable chimney hood 37 is provided with a plurality of supporting members 38 fixed at one extremity to the chimney hood. The opposite ends of said supporting members 38 frictionally engage the chimney 35 and hold the hood in adjustable position.

The burner receptacle 10 is provided with a threaded opening 39 into which may be screwed an angular feed valve 40. The angular feed valve comprises housing 41 threaded at 42 to register with threaded opening 39. The valve stem 43 is provided with a stem plug 44 adapted to fit snugly in seat 45. A threaded bushing 46 provided with a valve stem opening 47 and packing 48 is screwed into the housing of the valve 40, as more specifically shown in Fig. 5. Mounted about the valve stem 43 and between the plug 44 and the bushing 46 is a helical spring 49 which tends to maintain the valve stem plug seated and the valve closed.

Mounted on the outside end of the valve stem 43 is an annular sleeve member 50 having a face 51 adjacent the annular outside face 72 of the housing 41. This member 50 on the face 51 is provided with extending pointed lugs 52 which are adapted to register with corresponding angular slots 71 in the valve housing when the valve stem plug is seated. There may be two or more such pointed lugs in the face 51 with corresponding angular slots in the valve housing.

It will be observed that, when the valve stem is turned through an arc of approximately 90°, for example, by use of the handle bar 53 keyed on said sleeve 50 which is held in place by washer 70 and pin 54, the stem plug 44 is removed from its seat and the valve completely opened. The points of the lugs 52 will then rest on the outside face 72 of the valve housing. To close the valve a turn of the handle bar in the reverse direction through the same arc is sufficient. The extending angular lugs 52 move into the angular slots 71 and the spring 49 causes the stem plug 44 to seat and thereby completely close the valve. The valve housing is provided with a threaded inlet 55 into which is screwed a feed line 56. The valve housing is provided with a threaded cleanout opening 57 which may be closed by a threaded plug 58. The feed line 56 may be connected with a suitable storage tank, not shown, from which liquid fuel may gravitate or be forced through the feed line 56.

In operating the heater, valve 40 is opened and fuel oil which may be a low grade distillate of 28°–30° A. P. I. (degrees American Petroleum Institute) gravity is fed from the storage tank, not shown through line 56 through the valve 40 into the flash pan 10. The combustion unit and stack are removed, the fuel ignited and the combustion unit and stack replaced. It will be noted that the pins 17 and 30 corresponding with the slots 26 and 36 will hold the various parts in rigid relation.

Air is drawn through down draft tube 18, the amount of which may be regulated by the adjustment of the down draft regulator cover 19. The flame from the flashing oil is drawn up toward the combustion unit where it strikes the flame separator 32 and is met by secondary air drawn through the air ports 31 where substantially complete combustion is effected. The parts 19, 23 and 27 protect the burning operation from wind and rain and other disturbing factors.

If desired, a modified form of angle valve may be used in place of the valve disclosed in Fig. 5. Such a valve is more particularly disclosed in Figs. 7, 8 and 9 of the drawings and may comprise a housing 110 having suitable inlet port 111 and outlet port 112 and further provided with a cleanout plug 113 and flow regulator screw 114. The valve stem 115 may comprise an L-shaped member having at one end a counterweight 116 and suitably threaded at its opposite end by steep pitched threads 117. The end of the valve stem 118 is machined properly to seat in the valve as indicated at 119. The valve is further provided with a packing nut 120 which may be operated to adjust the packing 121 to prevent leakage from the valve. The inlet oil line 122 is suitably connected to the inlet port of the valve and is held in place by adjusting nut 123. To open and close the valve it is not necessary to turn the valve stem through more than 360° as the pitch of the threads is such as not to require it. This valve may be operated by simply contacting or kicking the counterweight with the foot to revolve it in the desired position.

As will be understood from the foregoing disclosure, the heater may be placed in a suitable location in the orchard where it is intended to be used and, if desirable, a number of heaters may be connected through suitable feed lines to one fuel supply tank. The heater may be placed in operation or extinguished very easily and will be operated only at such time as heat may be required. The feed valve is so designed in relation to the size of the heater that at no time is there necessarily more than two or three tablespoons full of combustible in the flash pan. Thus, when it is desired to shut off the heat, the valve is closed and the heater extinguishes itself in minimum time.

The heater is simple in construction, yet economical to manufacture, particularly efficient

in operation and can be manufactured at no more cost than the old so-called "smudge posts".

While certain novel features of the invention have been disclosed and are pointed out in the annexed claim, it will be understood that various omissions, substitutions and changes may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

An orchard heater comprising a dish-shaped burner receptacle adapted to contain a relatively small quantity of liquid fuel, a cover for said receptacle having an outlet opening, a combustion unit associated with said opening, an imperforate down-draft tube extending into said receptacle adjacent a side wall thereof and terminating in a single opening closely above the normal operating level of said fuel, and an arcuate baffle extending downwardly from said cover and across said burner receptacle intermediate said down-draft tube and said outlet and terminating closely above the normal level of said fuel, said baffle being positioned to provide a space between said baffle and the surface of said fuel adjacent the outlet of said down-draft tube and to spread a current of primary air across substantially the entire surface of said fuel.

LUKE O. MORIN.