Aug. 3, 1926. 1,594,797

W. C. SCHEU

ORCHARD HEATER

Filed July 5, 1922

Fig 1

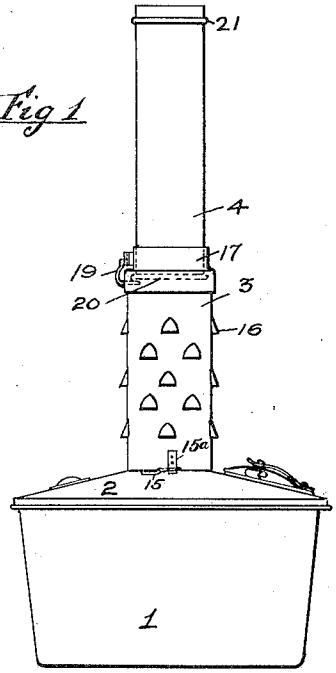


Fig 2

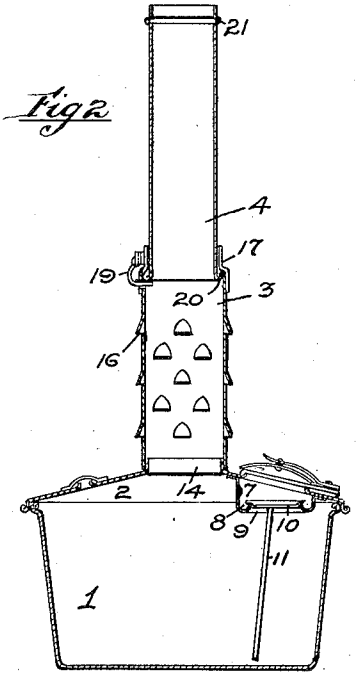


Fig 3

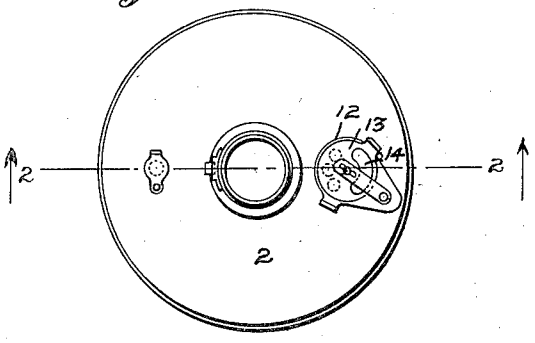


Fig 4

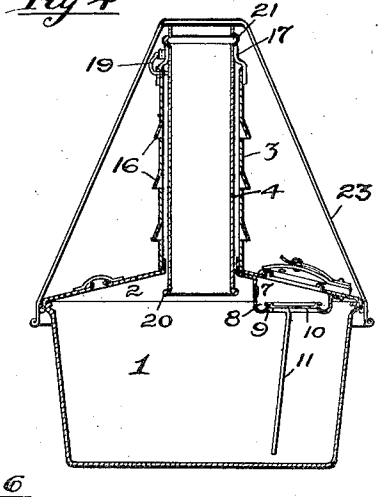


Fig 5

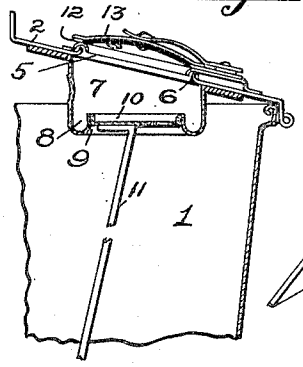
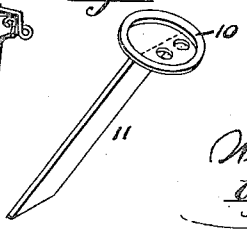


Fig 6



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Patented Aug. 3, 1926. 1,594,797

UNITED STATES PATENT OFFICE.

WILLIAM C. SCHEU, OF LOS ANGELES, CALIFORNIA.

ORCHARD HEATER.

Application filed July 5, 1922. Serial No. 572,784.

This invention relates to an improved device for protecting orchards from damage by frosts. It is particularly adapted to burn liquid fuels of varying grades and qualities from the heavy crude oils and distillates to the finer and lighter grades.

When damaging frosts and freezes occur during the blossom and fruit period and it becomes necessary to resort to artificial heat to protect the trees from frost damage it is of the utmost importance that the heating devices be of such a construction that the consumption of fuel is so regulated and controlled through the medium of automatic and manually controllable means that practically no smoke is produced.

Such a condition produces the maximum heat with the least consumption of fuel, and where all of the gas generated from the fuel is consumed there is a minimum of carbonaceous and asphaltic material or residue deposited around the interior of the heaters to interfere with their perfect operation.

The present invention embodies a construction and controllability that will produce practically smokeless heat, from any burnable grade of liquid fuel, for prolonged periods, with the minimum of care and attention and will hold and maintain uniform combustion as long as any fuel remains in the heater.

One object of the present invention is to incorporate in the design and construction of an orchard heater an easy and reliable means for igniting the fuel in a battery of distributed heaters.

Another object of the invention is to provide a sectional stack wherein the generated gases are consumed, of such a construction that it will readily telescope when the heaters are out of operation and which will in the act of telescoping tend to scrape and free the interior surface of the outer section of the stack from accumulated carbonaeous and asphaltic residue that may be deposited thereon through the operation of the heater.

Another object of the invention is to provide a sectional stack for an orchard heater having positive mechanical means for holding and maintaining the stack in extended position, instead of depending on frictional engagement. At times in the operation of orchard heaters, on account of extremely low temperatures, it becomes necessary to operate the heaters at a maximum capacity of heat production, at which times the metal of the stacks becomes quite hot and where friction joints are depended on to hold the stacks in extended position they sometimes fail and permit the stacks to collapse on account of the uneven contraction and expansion loosening the friction joints.

Another object of the invention is to provide a device located in or adjacent the air inlet opening, to act automatically as a deflector or retardent member, whereby the gas generating flame at or near said air inlet opening is prevented from being wholly drawn away from said opening, or from the surface of the oil, by the strong draft passing through the combustion stack and thereby a fire is maintained at or adjacent said air inlet opening at all times and during all conditions of operation whether using a light or a heavy grade of fuel.

Another object of the invention is to provide a heater having a storm or rain shield separable therefrom during actual operation of the heater, and so arranged as to be easily applied when the heater is out of operation.

Other objects and advantages will become apparent as the construction and operation are made more manifest by a study of the drawings accompanying this specification and claims.

It will be observed that like figures of reference apply to like parts on the drawings.

In the drawings, Figure 1 is a side elevation of a heater embodying my invention, set up as it would be for operation.

Figure 2 is a vertical cross sectional elevation on line 2—2 of Figure 3, looking in the direction of the arrows with the parts in like position to Figure 1.

Figure 3 is a plan of the heater as set up in Figure 1.

Figure 4 is a cross sectional elevation on the same plane as Figure 2 but with the parts in the positions of non-use and with the storm cover enveloping the whole upper part of the heater.

Figure 5 is an enlarged cross section of the part of the heater comprising the air inlet, ignition cup and flame deflector.

Figure 6 is a detail of the flame deflector.

This invention comprises an orchard heater having a fuel receptacle or bowl 1, a cover therefor 2, and a sectional telescopic combustion stack having sections 3 and 4.

Arranged in the cover 2 is an air inlet

opening 5 having an upturned flange 6 around its edge to prevent water from running into the opening.

Arranged directly under the air opening 5 is an ignition cup 7 secured to the under side of the cover 2. This cup 7 has an annular recess 8 extending around a central opening 9, the purpose of which is to form a pocket or cup for retaining a portion of ignition fuel for starting a fire and the generation of gas within the heater.

The edge of the annular recess 8 also acts as a support for a member 10 of disc form and having a depending flame deflector 11 attached thereto and extending down into the fuel receptacle to near the bottom thereof.

Arranged over the air inlet opening 5 is a perforated plate 12 pivoted to the cover 2 and adapted to swing over the opening 5. Pivoted centrally on the plate 12 is a shutter 13 having an elongated opening 14, the shutter 13 is adapted to be turned on the plate 12 and expose the openings therein as may be necessary to admit the air required to maintain combustion in the gas generating space in the heater.

The sectional telescopic stack comprising a part of this invention is made of two parts. The lower section 3 is detachably secured to a flange 14 of the cover 2 by means of clips 15 and engaging lugs 15a.

The wall of this stack section is provided with openings 16 made by bending the metal of the wall adjacent the openings outward, the drawings show the metal bent outward to give a smooth interior. This method of producing the air openings in the stack produces what I term a louvre combustion stack.

This lower section 3 is provided with a reducing collar 17 secured to its upper end. Pivoted or otherwise movably secured to the outside of the collar 17 is a member 19 having a portion extending through an opening into the interior of the stack.

The telescopic section 4 is adapted to pass within the section 3 when in telescopic position. The lower end of this section 4 is provided with an outturned false wired edge 20 and its upper end with an outturned bead 21.

When the stack is extended the lower false wired edge stops against the inturn of the collar 17, and the inward extension of the member 19 engages under the false wired edge 20 and holds the stack in extended position.

When the stack is telescoped as in Figure 4 the outturned bead 21 of the upper end of the stack 4 rests on the end of the reducing collar 17.

It will be noted that the overall diameter of the false wired end 20 of the stack section 4 is just slightly smaller than the inside diameter or the stack section 3 so that when the section 4 is telescoped into 3 the false wired edge 20 will scrape the interior of section 3 and remove the adhering carbonaceous and asphaltic residue deposited during operation of the heater.

Heretofore it has been necessary to take the stack off the heaters in order to remove the residue, but with this improved arrangement the mere act of pushing the section 4 through section 3, cleans the interior of 3 and scrapes the residue down into the bowl of the heater, it being then dumped out when the bowl is cleaned of its residue.

The storm and rain shield 23 is an ordinary conical hood large enough to completely enclose the stacks and cover of the heater, this hood is always applied when the heaters are left standing in the orchard during the non-use season.

As has been previously stated, various grades and qualities of liquid fuel must be consumed at times hence it is necessary to provide means whereby a fire will be maintained in the heaters regardless of the quality of fuel being used, the only manual adjustment necessary, being, the regulation from time to time, of the air supply through the medium of the air control members 12 and 13.

The feature in this invention that acts automatically in the control of the fire is the flat flame deflector 11.

I have here shown just a flat plate or finger extending from near the air inlet opening down to near the bottom of the bowl.

The function of this simple device is to offer just sufficient retardation or obstruction to the movement of the flame adjacent the air inlet opening, to prevent it from being drawn away from this location by the draft from the stack.

When this type of heater is properly adjusted to suit the grade and quality of fuel being used, a roaring fire is maintained just at the air opening and reaching down and around the obstructive plate 11, to and across the surface of the fuel toward the opening into the stack.

The office of this intense fire, at and around the air opening, is to generate a gas from the surface of the oil, which gas as generated is being constantly drawn into the stack for consumption, and when the generating fire is properly maintained the necessary amount of gas is continually generated to maintain proper combustion in the stack and the heater is consequently producing the maximum heat with practically no smoke.

This whole situation is entirely dependent on being able to maintain a proper and sufficient generating flame adjacent the air inlet opening in the cover.

The obstructive member 11 at this point should be only sufficiently effective to prevent the generating fire from being pulled

away from the space adjacent the air inlet opening, otherwise the excess retarding effect of too much obstruction might seriously interfere with getting a maximum efficiency out of the heaters.

To start these heaters in operation it is only necessary that the plate 12 over the air inlet opening, be swung to one side and a small quantity of burning oil, such as a mixture of gasolene and kerosene be poured into the cup 8, it being understood that the stack has first been adjusted to extended position.

This burning ignition oil is applied from a can having a long spout with an asbestos wick in the end, such as is well known by those skilled in the art.

This burning oil will bubble over the edge of the flange 9 of the ignition cup, and some will run down on the plate 11, and sometimes a small bunch of excelsior is placed in the air opening and the burning oil poured on it, which will immediately ignite it.

The draft from the stack pulls the flame from the air inlet opening down into the heater, over the surface of the oil, and in a few seconds gas begins to form and pass into the stack where the air coming in through the openings 16 mixes with it and there is formed a combustive mixture which burns quite vigorously and smokelessly and produces an intense heat.

Part of the generated gas of course goes to maintain the generating flame adjacent the air inlet opening. As soon as sufficient gas is being generated to maintain the generating flame in the fuel receptacle and the heating flame in the stack, the plate 12 is swung around over the air inlet opening and the shutter 13 is adjusted relative to the holes in 12 to give the proper quantity of air necessary to maintain the intensity of fire desired.

At the beginning of operation with the heater nearly full of oil, less air is required, but as the fuel is consumed, and the surface recedes down away from the air inlet opening, the generating flame increases in size and needs more air. Then is when it becomes necessary to readjust the shutter 13 to give the additional air required. This adjustment is necessary several times during the period that one filling of the bowl is being consumed.

It is the practice where a number of heaters are in operation during a cold night to apportion a given number of heaters to each of several attendants who passes from one to the other and adjusts the air supply as may be required to suit existing conditions.

With the problem solved of always maintaining a fire under varied conditions, which is the result of my deflector, the operation of a large battery of heaters becomes a very simple matter and can be attended to by unskilled attendants.

It is thought that my description herewith will enable anyone skilled in the art to operate these heaters successfully, and while I have described and illustrated the invention in its preferred embodiment I do not wish to be understood as confining or limiting the invention to the exact details of construction and arrangement as shown, but wish to be understood as claiming the invention as broadly as the state of the art will permit.

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

1. An orchard heater comprising a fuel receptacle, a cover therefor having an air inlet opening and a combustion stack mounted on said cover, said combustion stack being made up of parallel sided telescopic sections, air inlet means in one of said sections to direct air into the said stack and pivotal means on one of said telescopic sections for engaging the other of said sections to hold said stack in extended position, an ignition cup adapted to hold a body of fuel separated from the body of fuel in said receptacle and an imperforate deflector means located within said fuel receptacle adjacent said air inlet opening and manually controllable means for regulating the supply of air to said heater.

2. An orchard heater comprising a fuel receptacle, a cover therefor having an air inlet opening and a combustion stack, said combustion stack having air openings in its side wall for directing air angularly into the combustion space of said stack, means adjacent said air inlet opening for retaining a quantity of ignition fuel separated from the fuel in said receptacle and an imperforate deflector means arranged adjacent thereto for diverting the flame generated adjacent said air inlet opening from a straight line path to said combustion stack.

3. An orchard heater for burning liquid fuel, comprising a fuel receptacle, a cover therefor having an air inlet opening and a sectional telescopic combustion stack comprising two straight walled sections of differing diameters and said stack having air inlet means comprising openings formed by bending a portion of the metal of the wall of said stack away from the normal plane of the wall, pivotal means on one of the sections of said stack for engaging another section of said stack to hold said stack in extended position, an enlarged portion on one of said telescopic sections whereby when the stack is telescoped the interior of one section is scraped to remove residue therefrom.

4. An orchard heater comprising a fuel receptacle and a cover therefor, a two part telescopic stack extending upward therefrom, one of said parts having an enlarged

portion and sliding within the other said part, the said enlarged portion scraping the interior of said other portion to remove the residue therefrom with separate mechanical means for holding said stack sections in extended position.

5. An orchard heater comprising a fuel receptacle, a cover for said receptacle having air inlet means, an ignition device connected with said cover for facilitating the ignition of the fuel in said receptacle, an imperforate device suspended from said ignition device for maintaining a gas generating flame adjacent said air inlet in said cover and a combustion stack connected with said cover for consuming the gases generated within said receptacle.

6. An orchard heater comprising a fuel receptacle, a cover closing the opening into said receptacle, air inlet means in said cover, a flame retarding means comprising a flat imperforate plate suspended at said air inlet means to assist in maintaining a gas generating flame at said air inlet in said cover, an ignition cup secured adjacent said air inlet and a stack extending upward from said heater with air inlet means in its side wall to admit air to support combustion within said stack.

7. A telescopic combustion stack for orchard heaters comprising a lower stationary section, an upper movable section, pivotally connected mechanical means holding said sections in extended position, the upper movable section having an enlarged portion associated therewith for removing residue from the inside of the stationary section when moved within said section.

8. An orchard heater comprising a fuel receptacle, a cover therefor, air inlet means in said cover, an imperforate flame deflector means suspended under said cover at said air inlet means, said deflector comprising a member extending toward the bottom of said receptacle and a disc member embracing the opening at said air inlet means, and having means therein for admitting air to said receptacle.

9. A combustion stack for orchard heaters comprising a lower section having parallel side walls and a reduced opening at one end, an upper section mounted to move loosely through the reduced opening in said lower section, a pivotal holding device for maintaining said stack sections in operative position, and an enlarged portion on said upper section to act as a stop against the reduced portion of said lower section and to act as a scraping and cleaning member when moved through said lower member.

In testimony whereof I herewith affix my signature.

WILLIAM C. SCHEU.