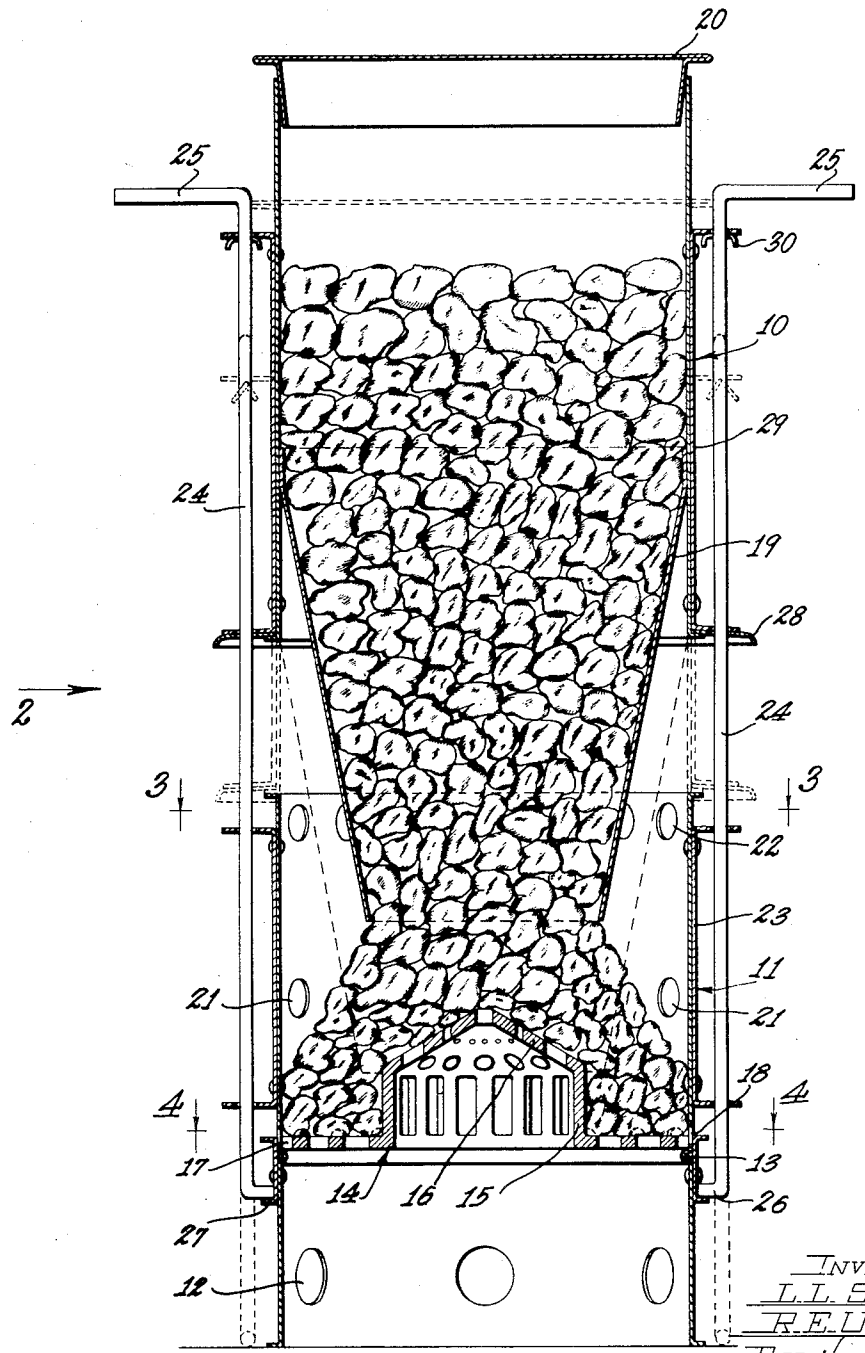
Dec. 12, 1933. L. L. SWARTZ ET AL 1,938,645

HARD FUEL ORCHARD HEATER

Filed June 7, 1932 2 Sheets-Sheet 1

FIG. 1



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FIG. 2.

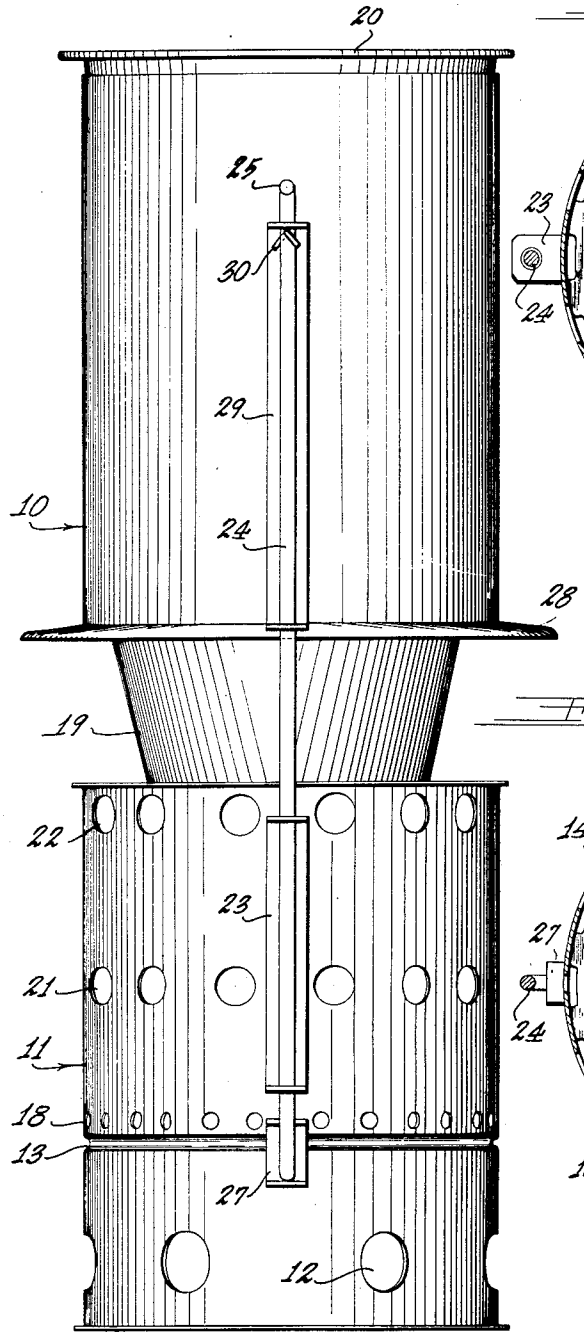


FIG. 3.

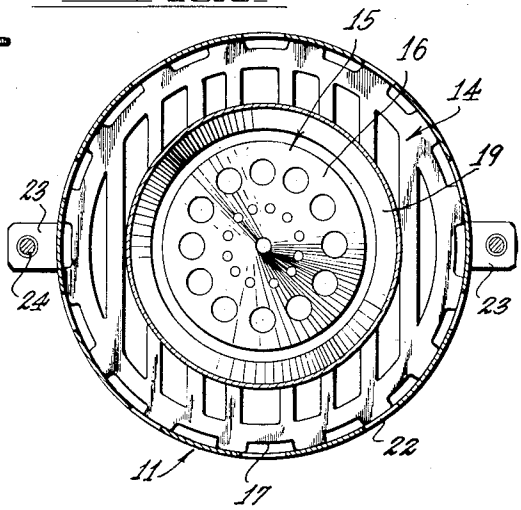
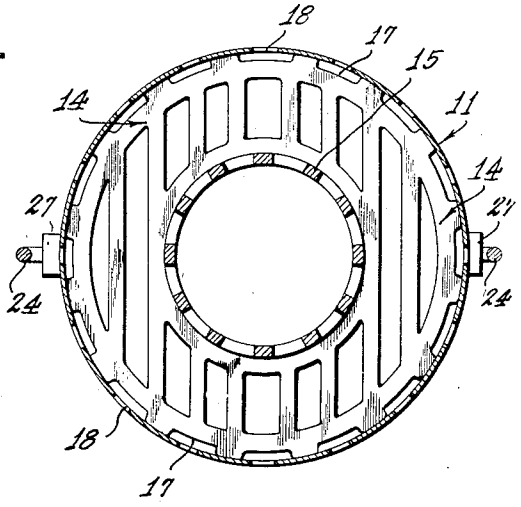


FIG. 4.



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UNITED STATES PATENT OFFICE

1,938,645

HARD FUEL ORCHARD HEATER

Leslie L. Swartz, San Bernardino, and Ralph E. Upright, San Fernando, Calif.

Application June 7, 1932. Serial No. 615,846

11 Claims. (Cl. 126—59.5)

This invention relates to improvements in hard fuel orchard heaters and may be considered as an improvement over the heater disclosed in the application filed by Leslie L. Swartz April 14, 1932, Serial No. 605,246.

An object of the invention is to provide an improved hard fuel orchard heater having a grate and a hopper disposed above the grate serving as a fuel reservoir for hard fuel such as petroleum coke briquettes. The present invention contemplates an adjustment of the outlet from the hopper relatively to the grate so that the size of the fuel or fire bed on the grate can be varied according to varying conditions thus enabling a variation in the consumption of fuel and also the amount of heat generated by the heater.

Another object of the invention is to provide an orchard heater with the above mentioned characteristics which is so designed as to simultaneously adjust the outlet for the products of combustion upon adjusting the size of the fuel bed on the grate so that when a large fuel or fire bed is formed on the grate there will be a larger outlet for the products of combustion, creating a greater draft commensurate with the size of the fuel bed on the grate.

Another object of the invention is to provide a hard fuel orchard heater having a grate and a hopper which automatically feeds fuel to the grate and which is so designed as to enable the heater to have its hopper released to automatically cause the discontinuance of fuel fed to the grate and the consequent ultimate dying out of the fire. In this construction the burning fuel on the grate is not extinguished but is allowed to continue to burn and to be completely consumed so that on restarting or refiring the orchard heater there are no partially burned pieces of fuel on the grate which are usually difficult to start. At the same time the unburned fuel in the bottom of the hopper, which is first to be deposited on the grate on restarting, is left in such a condition as to facilitate refiring or restarting of the heater.

With the foregoing and other objects in view, which will be made manifest in the following detailed description, and specifically pointed out in the appended claims, reference is had to the accompanying drawings for an illustrative embodiment of the invention, wherein:

Fig. 1 is a sectional view through the improved orchard heater.

Fig. 2 is a view in side elevation taken in the direction of the arrow 2 upon Figure 1.

Fig. 3 is a horizontal section taken substantially upon the line 3—3 upon Figure 1.

Fig. 4 is a horizontal section taken substantially upon the line 4—4 upon Figure 1.

Referring to the accompanying drawings, wherein similar reference characters designate similar parts throughout, the improved orchard heater consists of a two part body formed of upper and lower cylindrical shells 10 and 11 which may be formed of sheet metal. The lower shell is designed to rest upon the ground and has draft openings 12 arranged beneath a crimp or bead 13 which provides a ledge on the inside of the shell to support a grate 14. The grate 14 is preferably provided with an upstanding central portion 15, the top of which may be coned as indicated at 16, and the body of the grate as well as the upstanding central portion has suitable apertures formed therein.

In the edges of the grate there are formed recesses 17, as clearly shown in Figure 4, and small apertures 18 are formed in the shell 11 opposite these recesses. These apertures admit air and tend to keep the grate relatively cool and by having recesses 17 formed in the edge of the grate opposite each aperture there is no tendency for any ash to collect or pile up adjacent the edge of the grate to cover or close the apertures 18. A conical member 19 is secured to the interior of the upper shell 10 and projects downwardly below the bottom of the upper shell. This conical member cooperates with the upper shell to form a hopper, the outlet of which is centrally over the raised central portion 15. The hopper is designed to serve as a fuel reservoir for a hard fuel, preferably petroleum coke briquettes. A removable cover 20 is provided covering the hopper and which is substantially air tight so that there is no tendency for any draft to be created up through the fuel in the hopper and out through the top of the hopper. The fuel is fed from the bottom of the hopper onto the grate and forms a conical fuel or fire bed on the grate surrounding the raised central portion. Rows of apertures 21 and 22 enable air to enter the lower shell 11 to supply the oxygen for combustion. The hopper is adjustably supported on the lower shell 11 and to this end a pair of large brackets 23 are secured to the lower shell 11 serving as guides for supporting rods 24. These supporting rods have handle 25 at their upper ends and inturned lower ends 26. A pair of small brackets 27 are secured to the lower shell 11 beneath the large brackets 23 and the flanges at the top and bottom thereof are capable of being engaged by the inturned portions

26 of the supporting rods 24 to support the hopper in various elevated positions. If a greater adjustment is desired, additional brackets similar to brackets 27 may be secured to the lower shell beneath the brackets shown. The upper shell has an outwardly extending flange 28 adjacent its bottom through which the supporting rods 24 extend. This flange is designed to engage the top of the lower shell 11 when the hopper is in its lowermost position and in elevated position the flange acts as a baffle preventing heated air from rising vertically along the sides of the heater and causing it instead to be distributed outwardly. Brackets 29 are secured to the upper shell and the supporting rods 24 slidably extend therethrough. Each supporting rod is provided with a pin 30 adjacent its upper end capable of engaging the under side of the top flange of its respective bracket 29.

The heater is shown in Figure 1 in fuel burning position, in which position the fuel is burning on the grate and the ash is dropping through the grate. As the fuel on the grate is consumed, the supply is continually replenished by gravity, the fuel continuously sinking through the outlet from the hopper, thus maintaining a constant supply of burning fuel on the grate. If it is desired to increase the size of the fuel bed and to increase the consumption and the heat generated, the hopper may be lifted to a greater elevation than the full line position shown. This is accomplished by rotating supporting rods 24 to enable the inwardly extending portions 26 to pass over the upper flanges of the lower brackets 27, after which on reverse rotation of the rods 24 the portions 26 may be positioned on top of the brackets. In this way the hopper is supported in its uppermost position wherein the greatest quantity of fuel is maintained as a conical fire bed over the grate. If it is desired to shut off the fire before all of the fuel in the hopper has been consumed, this is accomplished by merely turning the supporting rods 24 by their handles 25 so as to cause the portions 26 to disengage brackets 27. As the fuel on the grate burns, the hopper gradually settles by gravity, moving down into the dotted line position shown on Figure 1. In this way the hopper follows the burning fuel on the grate downwardly without discharging any more fuel onto the grate. At the same time all of the fuel which has been burning on the grate is given an opportunity to burn up completely so that there is no partially burnt fuel left on the grate which is difficult to start on refiring.

When the hopper reaches its lowermost position, as shown in dotted lines, the outlet is disposed about the upstanding center portion 15. It need not fit snugly about the upstanding central portion but there may be some small clearance, as indicated by the dotted lines. In this way the upstanding central portion of the grate forms a type of closure for the hopper when in its lowermost position. The fire on the grate instead of being snuffed out is allowed to burn up and the briquettes in the hopper do not tend to burn therein because there is no upward draft through the hopper.

On refiring, new fuel is delivered from the hopper to the grate when the hopper is subsequently lifted, which new or fresh fuel is comparatively easy to start as compared with partially burned fuel. The downward movement of the hopper is limited to the dotted line position by the engagement between the bottom of the upper shell 10 with the top of the lower shell 11. It is possible to employ the supporting rods 24 to lock the two shells together to facilitate carrying or transporting the heater from one place to another. This is accomplished by turning the positioning rods 24 through a quarter of a revolution from the position shown, forcing them downwardly and then turning the portion 26 inwardly beneath the bottom of shell 11. In this way the two shells will be held together and the entire heater may be lifted by the handles 25 without lifting the hopper with respect to the lower shell or grate and causing a discharge of fuel therefrom in the event that the hopper is filled or partially filled with fuel.

It will be noted that the fuel on the grate tends to cone about the raised central portion which is perforated. This upstanding central portion in the center of the cone of fuel on the grate facilitates an even distribution of air through the burning fuel enabling complete and efficient combustion of the fuel.

As brought out in the application of Leslie L. Swartz above referred to, petroleum coke briquettes are manufactured with an asphaltum having volatile constituents and it is desirable to distill off these volatile constituents and cause them to pass gradually through the flame of the fuel burning on the grate so that they will have an adequate opportunity to be completely consumed without the generation of smoke or smudge. The present heater likewise affords these advantages in that as the fuel settles in the hopper it gradually approaches the fire on the grate. As there is no upward draft through the hopper, the fuel in the hopper does not burn before being deposited on the grate. At the same time as the fuel approaches the fire on the grate, the volatile constituents in the petroleum coke briquettes are continuously driven off and are caused to discharge gradually through the outlet from the hopper so that they will pass freely through the flame and will be completely consumed without the generation of any smoke or smudge.

From the above described construction it will be appreciated that an improved hard fuel orchard heater is provided which provides for the adjustment of the size of fire and consequently adjustment of the heat generated. This is accomplished in a construction which automatically feeds fuel from the hopper to the fire bed as the fuel is required on the fire bed. On turning the supporting rods 24 the heater will automatically shut itself off, allowing the burning fuel on the grate to burn up to leave no partially burned fuel which would hinder subsequent firing. The fuel used on refiring is fresh fuel which has been properly conditioned by the volatile constituents being driven off as the fuel approaches the fire zone. The improved heater also has the advantage of being capable of storing fuel in the hopper without requiring the presence of a separate receptacle, such as a bag conventionally employed, allowed to rest near the orchard heater and which usually requires rehandling of fuel and subjects it to weathering. These disadvantages are eliminated in the present construction.

Various changes may be made in the details of construction without departing from the spirit or scope of the invention as defined by the appended claims.

We claim:

1. An orchard heater comprising a grate, means for supporting the grate, a hopper positioned over the grate having an outlet disposed thereover, a cover for the top of the hopper, and means for releasably supporting the hopper with its outlet considerably above the grate whereby the hopper

when released may sink by gravity as fuel on the grate is consumed to ultimately cause the fire to die out when the fuel thereon is completely consumed.

2. An orchard heater comprising a grate, means for supporting the grate, a hopper positioned over the grate having an outlet disposed thereover, a cover for the top of the hopper, and means for releasably supporting the hopper with its outlet considerably above the grate whereby the hopper when released may sink by gravity as fuel on the grate is consumed to ultimately cause the fire to die out when the fuel thereon is completely consumed, said means serving to hold the hopper in one of several adjusted elevated positions to vary the size of fuel bed on the grate.

3. An orchard heater comprising a grate, means for supporting the grate, a hopper positioned over the grate having an outlet disposed thereover, a cover for the top of the hopper, and means for releasably supporting the hopper with its outlet considerably above the grate whereby the hopper when released may sink by gravity as fuel on the grate is consumed to ultimately cause the fire to die out when the fuel thereon is completely consumed, said grate having a raised central portion adapted to partially enter the hopper outlet when the hopper is in lowermost position.

4. An orchard heater comprising a grate, means for supporting the grate, a hopper positioned over the grate having an outlet disposed thereover, a cover for the top of the hopper, and means for releasably supporting the hopper with its outlet considerably above the grate whereby the hopper when released may sink by gravity as fuel on the grate is consumed to ultimately cause the fire to die out when the fuel thereon is completely consumed, said means serving to hold the hopper in several adjusted elevated positions to vary the size of fuel bed on the grate, said grate having a raised central portion adapted to partially enter the hopper outlet when the hopper is in lowermost position.

5. An orchard heater comprising a shell, a grate supported in the shell, a hopper positioned over the shell having an outlet discharging onto the grate, said hopper carrying a shoulder adapted to engage the top of the shell or to be spaced therefrom when the hopper is in elevated position forming an outlet for the products of combustion, means for closing the top of the hopper, and means for adjustably supporting the hopper on the shell.

6. An orchard heater comprising a shell, a grate supported in the shell, a hopper positioned over the shell having an outlet discharging onto the grate, said hopper carrying a shoulder adapted to engage the top of the shell or to be spaced therefrom when the hopper is in elevated position forming an outlet for the products of combustion, means for closing the top of the hopper, and means for releasably supporting the hopper in elevated position on the shell whereby the hopper when released may sink as fuel on the grate is consumed.

7. An orchard heater comprising a shell, a grate supported in the shell, a hopper positioned over the shell having an outlet discharging onto the grate, said hopper having wall portions adapted to engage the top of the shell when the hopper is in lowered position to reduce draft through the grate or to be spaced therefrom when the hopper is elevated to promote draft through the grate, means closing the top of the hopper, and means for adjustably supporting the hopper on the shell.

8. An orchard heater comprising a shell, a grate supported in the shell, a hopper having a normally closed top and having an outlet discharging onto the grate, said hopper being adjustably supported on the shell so as to vary the size of the fire bed on the grate, and means for causing the space between the shell and hopper to vary in accordance with the elevation of the hopper whereby when the fire bed is made larger by the elevation of the hopper the draft through the grate will be correspondingly increased and when the fire bed is made smaller the draft will be reduced.

9. An orchard heater comprising a shell, a grate supported in the shell below the top thereof, a downwardly tapering conical hopper having a normally closed top and having an outlet discharging onto the grate, and means for adjustably supporting the hopper on the shell so that in elevated position it will deposit a larger quantity of fuel on the grate and have its sides spaced farther from the top of the shell inducing a larger draft through the grate than when the hopper is in lowered position.

10. An orchard heater comprising a shell, a grate supported in the shell below the top thereof, a downwardly tapering conical hopper having a normally closed top and having an outlet discharging onto the grate, and means for adjustably supporting the hopper on the shell so that in elevated position it will deposit a larger quantity of fuel on the grate and have its sides spaced farther from the top of the shell inducing a larger draft through the grate than when the hopper is in lowered position, said adjusting means being so constructed as to optionally permit the hopper to settle as the fuel on the grate is consumed.

11. An orchard heater comprising a grate having a cylindrical raised central portion, means for supporting the grate, and a hopper supported over the grate having an outlet arranged over the raised central portion, said grate and hopper outlet being adjustable relatively to each other to vary the distance therebetween, the hopper outlet being of approximately the cross sectional size of the raised central portion and being capable of assuming a position extending down over the raised central portion to discontinue further discharge of fuel onto the grate and cause the fire thereon to die when the fuel on the grate is consumed.

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