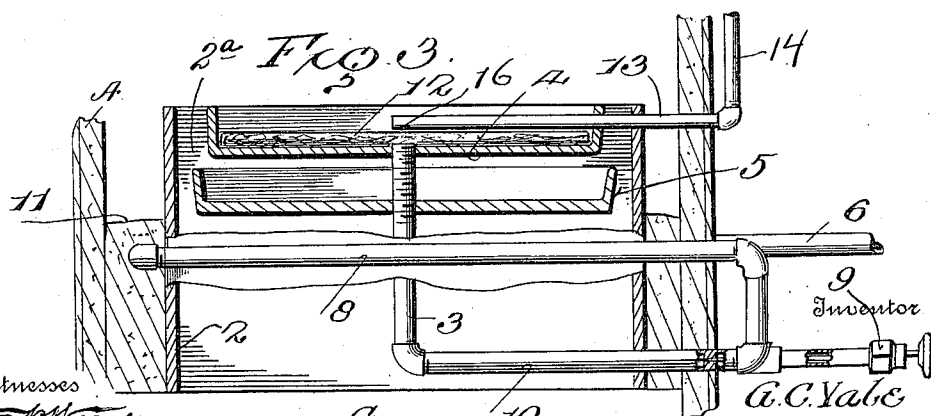
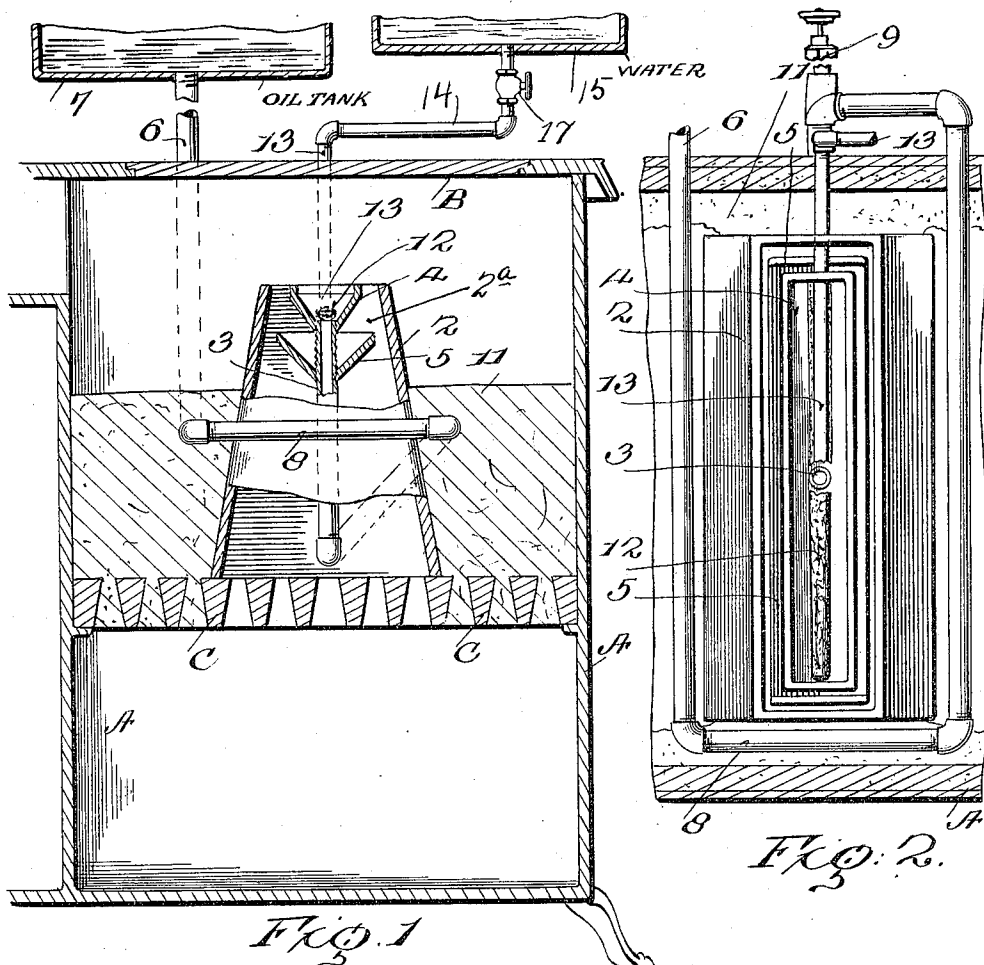


G. C. YALE.
CRUDE OIL BURNER.
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Patented Nov. 15, 1910.



Witnesses
W. H. Woodson
Juana M. Fallin,

By *H. H. Macy*, Attorney
G. C. Yale, Inventor

UNITED STATES PATENT OFFICE.

GEORGE C. YALE, OF BOYNTON, OKLAHOMA.

CRUDE-OIL BURNER.

975,740.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE C. YALE, citizen of the United States, residing at Boynton, in the county of Muskogee and State of Oklahoma, have invented certain new and useful Improvements in Crude-Oil Burners, of which the following is a specification.

My invention relates to oil burners adapted for use in stoves, furnaces or like constructions, and particularly to an oil burner of peculiar construction adapted to be supported upon the grate structure of the stove or furnace, the objects of the invention being to provide for a more perfect draft whereby a better combustion is secured; to provide a means for securing either a small or a large fire as desired; to provide means for preheating the oil prior to its passage through the regulating valve to the burner; and to provide an exceedingly simple and cheap construction which may be applied to any ordinary stove with a minimum of alteration therein.

My invention consists in the arrangement of parts and details of construction set forth in the accompanying specification and more particularly stated in the claims appended.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction, reference is to be had to the following description and accompanying drawing, in which:

Figure 1 is a sectional view of a stove and the grate thereof, my improved burner being shown partly broken away, and with the oil troughs in section; Fig. 2 is a fragmentary plan view enlarged of my improved burner, the stove being shown partly in section; and, Fig. 3 is a fragmentary section through a stove and a longitudinal section of the burner and the oil containing troughs therein.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawing by the same reference characters.

Referring to these figures, A designates the walls of a stove and B the top thereof, C designating the grate.

My improved burner comprises an outer casing 2 made preferably of three-eighths inch cast metal, and having a generally rectangular form in plan, the opposed longer

sides of the casing being upwardly and inwardly inclined toward each other, so as to provide for a maximum amount of air inlet at the bottom of the combustion chamber, which the casing 2 surrounds, this combustion space or chamber being designated 2^a.

Mounted within the combustion chamber, as will be later described, is the vertical inlet pipe 3 which carries at its upper end the longitudinally extending trough 4, the inlet pipe opening into the bottom of the trough. This trough has divergent sides and the edges of the trough are spaced from the upper edges of the casing 2 about one-half inch all around.

Mounted in any suitable manner as upon the supply pipe 3, below the trough 4 is the trough 5 which likewise has divergent side walls. This trough is larger than the trough 4 and extends to within about one-quarter inch of the side walls. It will thus be seen that an air space is left around the troughs 4 and 5, this air being admitted at the bottom of the combustion chamber 2^a and through the grate. It will be also noted that the trough 4 is sufficiently smaller than the trough 5 so that any surplus oil from the trough 4 will drop into the trough 5 and be burned therein.

In order to supply oil to the pipe 3, I provide an oil-conducting pipe 6 which extends out of the stove to any suitable oil tank 7, this oil tank being supported at some distance away from the stove or furnace. The pipe 6 extends into the stove, and then extends around the outside of the casing 2 in the form of a coil 8, the end of the pipe then extending out of the stove, where it is provided with a valve 9 of any suitable construction. From the valve, the supply pipe, designated now by the numeral 10, extends once more into the stove and into the end of the casing and to the vertical inlet pipe 3. It will thus be seen that the oil supplied from the tank 7 will pass around the exterior of the combustion chamber, and is by this means thoroughly heated before passing through the needle valve. After passing through the needle valve, the oil passes through the combustion chamber to the uppermost trough 4. Thus the oil is thoroughly heated before it arrives at the trough 4 and the oil will be forced up into the upper part of the pipe 3. It is also to

be noted that the oil is heated before passing the needle valve 9, so that it is rendered much more fluid and therefore in a condition where it may be more delicately controlled by the needle valve.

Clay or other suitable plastic and refractory material, designated 11, is packed in upon the grate, C, and around the lower portion of the casing 2, the clay extending upward to a level above the coil 8, so as to thoroughly protect the oil pipe from too great heat in the upper portion of the stove. At the same time this clay packing 11 closes the space between the grate bars exterior to the casing 2, and thus causes all the air entering the lower portion of the stove below the grate bars to pass upward through the casing 2. Thus a forced draft is secured within the combustion chamber, the contracted upper end of the combustion chamber acting to further accelerate the currents of air as they pass the lower and upper combustion troughs 4 and 5.

Preferably I provide the uppermost combustion trough 4 with an asbestos wick 12 which extends along the bottom of the trough. The oil rising in the pipe 3 will be absorbed by this wick and distributed along the bottom of the trough. In order to secure a perfect combustion, I also provide a water pipe 13 which may enter the stove at any suitable point and is connected at its outer end to the water pipe 14 which extends to a tank 15. This water pipe 13, after it enters the stove, extends along above the upper trough to a point immediately above the outlet of the pipe 3, and is here formed with a drip opening 16. The pipe is provided exteriorly to the stove with a valve 17 for regulating the drip of the water. The water pipe extends but for a short distance inside of the stove, thus giving no chance for the generation of steam or evaporation of the water.

The advantages of my invention are as follows: The oil feed pipe, in its passage around the combustion chamber and within the stove, acts as a retort. The oil is heated very hot and expands to the upper end of the inlet pipe, leaving the pipe, which is hot, entirely unobstructed from the inlet valve to the burner. There is thus no possible chance for any stoppage, and no chance for an explosion.

It will be seen that the forced draft around the two combustion troughs draws the oxygen direct to the edges of the pans to help the combustion therein.

Another advantage of my invention resides in the fact that a minimum of change has to be made in the stove or furnace with which the burner is used in order to adapt it for such use. It will be seen that it is only necessary to perforate the stove wall at three points for the passage of the pipes 6, 8 and

10 so as to permit the entrance of the supply pipe 6, to permit the pipe section 8 to pass out of the stove to the valve casing, and permit the pipe section 10 to return to the stove and support the burner troughs 4 and 5.

I find in practice that my improved burner will burn ordinary crude black oil direct from the wells. Indeed, in practical operation, I find that the burner will use the waste oil which is ordinarily turned down the streams of an oil country. This oil is so crude as to be considered waste ordinarily, but it may be easily burned in my improved burner after having been cleared of trash. The stove is equally adapted for the burning of refined oil, kerosene, or gasoline, if desired. The stove will remain clean on its interior face for a long while, and indeed will become no more covered with soot or dirt than if wood were being used in the stove.

One of the principal advantages of my invention, aside from its capability of burning crude oil, is that there is a steady and regular feed of oil. The feed of oil is regulated by a needle valve located at the point where the oil is boiling hot. It is this fact which permits the use of crude oil by increasing the fluidity of the oil and therefore permitting its flow to be regulated by the needle valve 9. The drip pipe 13 leads direct to the pans, and feeds water steadily to the fire in the requisite amount to give combustion. It will be further seen that either a very low fire may be kept in the upper pan by turning on only sufficient oil to saturate the asbestos wick 12, or that the oil may be turned on to such extent that it will flow over the sides of the upper trough 12 and will drip down into the lower trough 5, and that thus a double burner is secured where high heat is desired. It is of course necessary to so regulate the flow of oil that the oil will not overflow from the lower trough and onto the grate. The regulation should be such that just enough oil is supplied to keep the fire burning to the degree required. It will be seen that by reason of the narrow spaces between the edges of the burning troughs 4 and 5 and the wall 2, the air passing through the grate will be thoroughly mixed with the burning fuel, thus securing a perfect combustion under all circumstances.

The operation of my invention is as follows: The valve 9 is turned sufficiently to permit of a small flow of oil to the burner trough 4, just sufficient oil being allowed to flow in to thoroughly saturate the wick 12.

My improved burner can be placed in any ordinary stove used for burning wood or coal, for boiler heating or for house heating. It can be put in position by unskilled workmen, and is easily repaired or replaced when desired. There are no complicated parts within the burner to clog, wear out, or be-

come broken, and inasmuch as the parts are extremely simple, they may be easily replaced by an unskilled mechanic.

While I have shown what I believe to be the best and simplest form of my invention, I do not wish to be limited to the details of construction or to the exact location of parts shown, it being obvious that many changes might be made without departing from the spirit of the invention.

Having thus described the invention, what I claim is:—

1. An oil burner including a casing open at both ends and forming a combustion chamber, a burning trough carried in the upper end of the combustion chamber, but spaced from the walls thereof, and an oil supply pipe coiled around the combustion chamber, then extending into the chamber and entering said trough.

2. An oil burner including an outer casing open at its upper and lower ends and inclosing a combustion chamber, superposed burning troughs carried in said combustion chamber, the uppermost trough being coincident with the upper end of said combustion chamber and nearly filling the upper opening of the same chamber, but being spaced from the walls thereof, the lower trough being larger than the upper, and a supply pipe leading to the upper trough.

3. An oil burner including an outer casing open at its upper and lower ends and inclosing a combustion chamber, superposed burning troughs carried within said combustion chamber, the uppermost trough being coincident with the upper end of the combustion chamber and nearly filling the upper opening of the same, but being spaced from the walls thereof, the lower trough being larger than the upper, and a supply pipe extending into the lower end of the combustion chamber, passing up through and supporting the lower trough and opening into the upper trough.

4. The combination with a stove, of a combustion chamber located within the stove, a burner located within the upper part of the combustion chamber, a supply pipe passing into said stove and around the exterior of the combustion chamber, then extended out of said stove, and then returned into the stove, into the combustion chamber and to the burner, and a regulating valve located in said supply pipe exteriorly to the stove.

5. In an oil stove, a casing open at its upper and lower ends, a burner coincident with the upper end of the casing, a supply pipe extending through the casing and to the burner, a regulating valve located in said supply pipe exterior to the casing, and means for heating oil prior to its passage through the regulating valve.

6. An oil burner including a casing in-

closing a combustion chamber, a burning trough in the upper end of said combustion chamber, but spaced from the walls thereof, a supply pipe coiled around the combustion chamber, entering the same, and connected to said burning trough, and a regulating valve located in said supply pipe exterior to the wall of said casing.

7. In an oil stove, a combustion chamber open at its upper and lower ends, superposed burning troughs carried at the upper end of the combustion chamber, but spaced from the walls thereof, the lowermost of said troughs being larger than the upper trough, a supply pipe coiled around said combustion chamber, then passing into the combustion chamber and to the upper trough, and a valve located in the supply pipe, exteriorly to the combustion chamber.

8. An oil burner including an outer casing having upwardly and inwardly inclined walls, said casing being open at its upper and lower ends, superposed burner troughs mounted in the upper end of said casing, but spaced from the walls thereof, and a supply pipe coiled around the exterior of the casing, provided with an inlet valve, and then entering said casing and extending to the uppermost trough.

9. The combination with a stove having a grate therein, of a casing mounted upon said grate and open at its upper and lower ends, a fuel supply pipe entering said stove from the exterior thereof, passing around the exterior of said casing, and then out of said stove, and being there provided with a regulating valve, then into the said stove again and into the casing and extending to the upper portion thereof, an upper burning trough carried at the upper end of said casing, but spaced from the walls thereof, into which the supply pipe opens, a trough supported below said upper trough, but larger than the same, and refractory filling material around said casing, closing the openings between the grate-bars exterior to the casing and supported on the grate surface.

10. In an oil burner, an exterior casing inclosing a combustion chamber, said casing being rectangular in section, a burning trough, rectangular in plan, located at the upper end of the casing and nearly filling the same, but spaced from the walls thereof, said burning trough having upwardly and outwardly extending walls, a supply pipe entering the bottom of the casing and extending upward to the trough, and a wicking of asbestos extending along the bottom from one end of the trough to the other.

11. In an oil burner, a casing open at its upper and lower ends, said casing being rectangular in section, a burning trough rectangular in plan and located at the upper end of the casing, but spaced from the walls thereof, said trough being approximately

V-shaped in cross-section, an oil supply pipe entering the bottom of the trough, an asbestos wicking extending along the bottom of the trough, from one end to the other, and a
5 water supply pipe located above the bottom of the trough, having a perforation discharging water immediately above the oil inlet opening to the trough.

12. The combination with a stove having
10 a grate, of a vertical casing open at its upper and lower ends and resting upon said grate, refractory packing material placed around said casing and closing the grate exterior thereto, a burner located within said casing,

at the upper end thereof, and an oil supply 15 pipe entering said stove from the outside, said pipe being carried within said refractory material and extending around the casing, then out of the stove, and being there provided with a regulating valve, then into 20 the stove, into said casing, and then to said burner.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE C. YALE. [L. s.]

Witnesses:

CLAIR VAUGHN,
A. R. SKIDMORE.