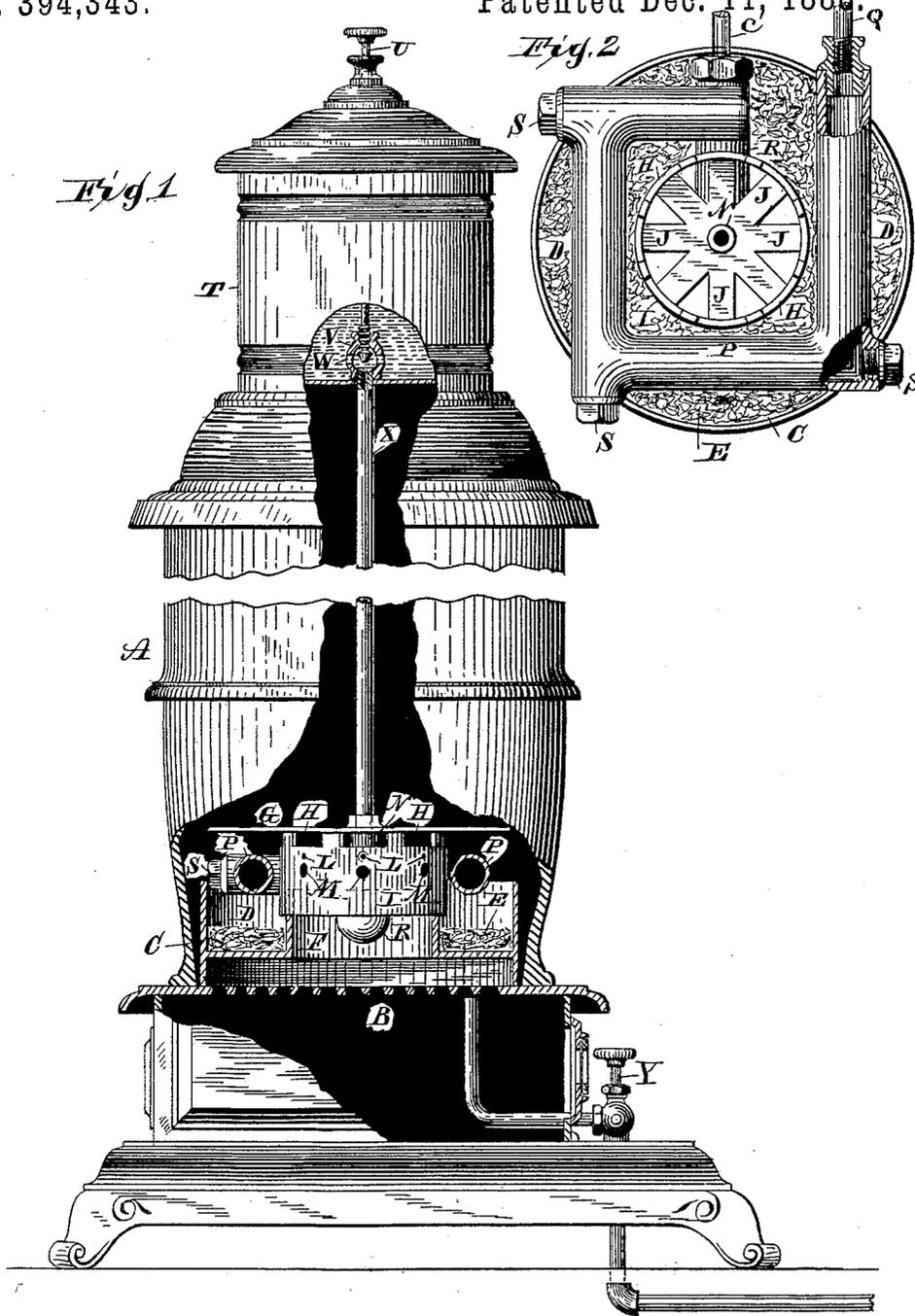


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APPARATUS FOR VAPORIZING AND BURNING HYDROCARBON OILS.

No. 394,343.

Patented Dec. 11, 1888.



WITNESSES,  
*Jas. H. Mahan,*  
*J. N. Allen.*

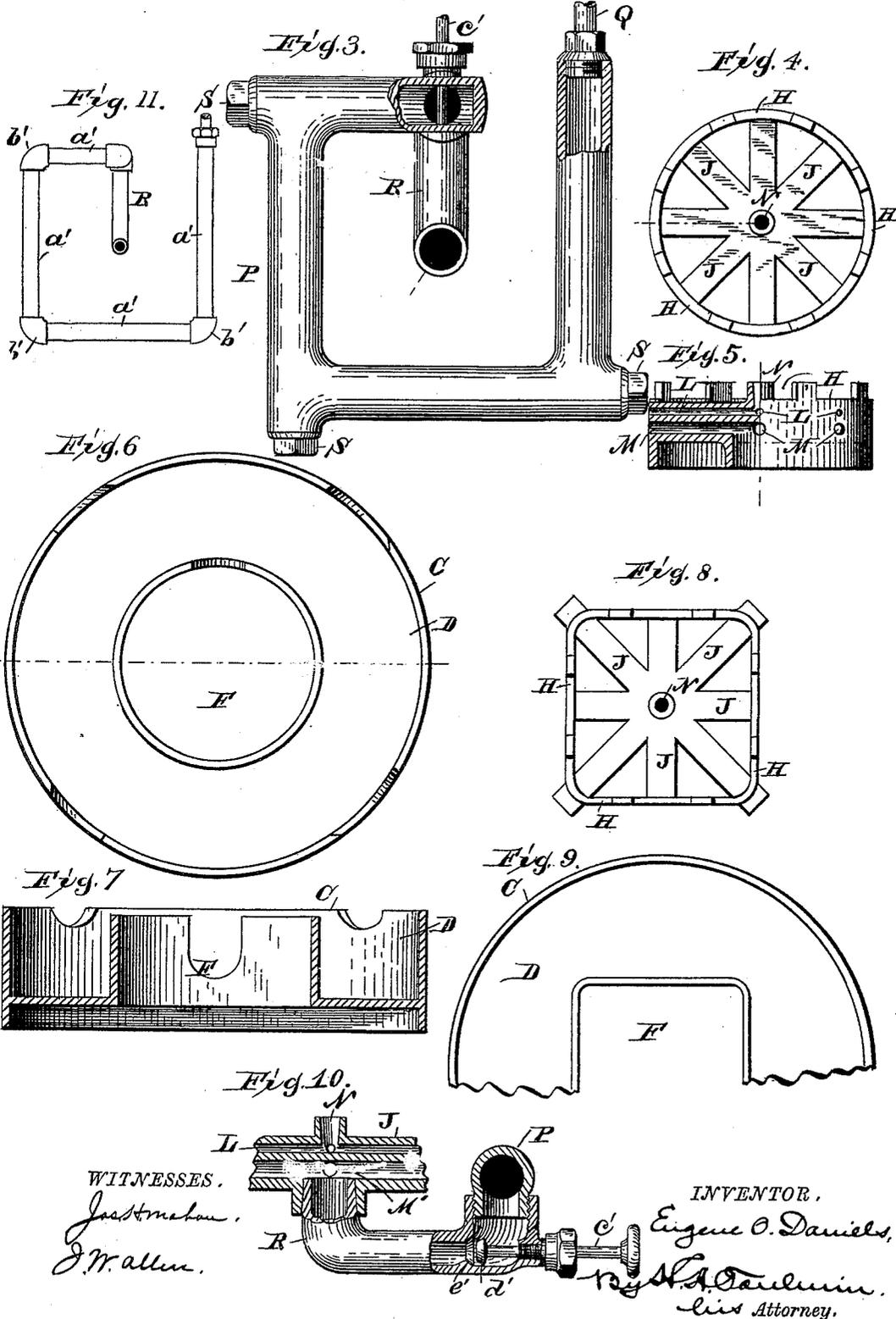
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# UNITED STATES PATENT OFFICE.

EUGENE O. DANIELS, OF SPRINGFIELD, OHIO.

APPARATUS FOR VAPORIZING AND BURNING HYDROCARBON OILS.

SPECIFICATION forming part of Letters Patent No. 394,343, dated December 11, 1888.

Application filed January 27, 1888. Serial No. 262,104. (No model.)

*To all whom it may concern:*

Be it known that I, EUGENE O. DANIELS, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Apparatus for Vaporizing and Burning Hydrocarbon Oils, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in hydrocarbon-oil burners, and is designed with special reference to being used in heating-stoves.

The essential objects of the invention are, first, that of reducing the oil to a vapor for burning it in flames directed, essentially, in a radial course, and of supplying currents of air above the flames, and also in an outward or radial direction, and with such force as to direct and hold the flames toward and against the encircling wall of a stove in which the device is placed, whereby the heat is fully utilized and its effect immediately felt by the stove, whence it radiates into the room; secondly, that of so reducing the oil and then burning the vapor and of supplying a column of water to the burner and so subjected to the action of the oil-flames as to be highly heated or reduced to steam and ejected into and commingle with the flames, whereby it is decomposed and its constituent gases utilized as a part of the fuel; thirdly, that of supplying a quantity of non-combustible absorbent beneath the burner-orifices, so as to absorb the drippings and give them off in vaporous form, whence they become a part of the fuel; and, fourthly, of certain other minor matters, hereinafter more fully pointed out.

In the accompanying drawings, forming a part of this specification, and on which like reference-letters indicate corresponding parts, Figure 1 represents a partial side elevation and sectional view of a heating-stove of any approved construction with my improved oil-burner mounted therein, and also partly in section and elevation; Fig. 2, an enlarged detail plan view of the drippings-receptacle, the retort, and the burner; Fig. 3, a detail enlarged plan view of the preferred form of retort; Fig. 4, a like view of the burner; Fig. 5, a partial side elevation and sectional view of the burner; Fig. 6, a plan

view of the drippings-receptacle; Fig. 7, a sectional view thereof; Fig. 8, a plan view of a modified form of burner; Fig. 9, a partial plan view of a corresponding form of the drippings-receptacle; Fig. 10, a detail sectional view of a portion of the retort, the burner, and the vapor-tube; and Fig. 11, a detail plan view of another modified form of retort.

The letter A designates a heating-stove of the ordinary or any approved type, upon the grate or perforated bottom plate, B, of which is placed a receptacle; C, constructed, preferably, of cast-iron and of the form shown, which includes an annular space, D, beneath the retort, and adapted to contain a quantity of non-combustible absorbent material, E—as asbestos. This material takes up the slight drippings of oil which occur when the oil is first turned on in lighting the burner, and the absorbent, being near the retort, becomes heated and the drippings vaporized and taken up by the flames. The receptacle, as C, also has a central air-passage, F, through which the current of cold air is drawn upward and deflected outward by the deflector G, passing through the apertures H in its radial course. The purpose of this supply of air and of directing it radially toward the walls of the stove is to assist in directing the flames toward the walls of the stove and to prevent them from rising upward and not going so directly against those walls. The advantage of this is obvious, for it intensifies the heat where it is most needed—namely, around the inner walls of the stove—whence its effect is more clearly perceived in the room.

The letter I designates the burner, the same being made, preferably, of cast-iron and composed of a series of radial arms, J, through each of which extends a vapor-passage, M, and a water or steam passage, L, respectively, from the central apertures, M' and N. These arms J are connected at their outer ends by a ring, H, notched at intervals to form passages for the purposes above mentioned. This burner fits upon the inner vertical wall of the receptacle C, as shown in Fig. 1. The letter P refers to a retort, made, preferably, of cast-iron and of rectangular form, and supplied with an oil-pipe, Q, at one end and a vapor-tube, R, at the other end, connected, preferably, as shown in Fig. 12. The inner

end of the vapor-tube enters the aperture M in the burner and compels the vapor to flow from the retort into the orifices K. The retort rests upon the receptacle C, which is provided with seats for it and for the vapor-tube, as seen in Fig. 7. The retort, being non-continuous, by reason of the gap appearing between the ends thereof, is free to contract and expand without liability of breakage. At the end of each side the retort is provided with an opening and a screw-threaded plug, S. The object of these devices is to admit of inserting an instrument into each side of the retort to cleanse and remove any carbonaceous or other deposits which may accumulate. The deflector G, as already intimated, rests upon the burner, (though it may be otherwise supported.)

Upon the upper end of the stove I place a water-reservoir, T, through the upper end of which loosely passes a valve-stem, U, the space around which allows of the escape of steam, should any be generated, whereby pressure is prevented. The lower end of the stem is screw-threaded and fits a column, V, through which is formed one or more apertures, W, which admit water into the tube X, which leads from the column into the aperture N of the burner. By adjusting the valve-stem U a sufficient amount of water is admitted to the tube X and subjected to the heat arising from the flames, and either highly heated or converted into steam on its way to and through the orifices L, from which it issues and commingles with the flames, being finally decomposed into its constituent gases and utilized as a part of the fuel, and adding to the intensity of the heat and reducing the consumption of oil. I contemplate using my improved oil-burner both with and without the water-supply device described, though I prefer to use it in connection with said device.

The particular construction and arrangement of the water-supply device may of course be varied; but I prefer those shown and described. I have had the burner in practical operation, and have found that it is very effective as a heater, and is economical in the consumption of oil and easily controlled. The oil-supply pipe Q is provided with a cut-off, Y, as seen in Fig. 1, and thence runs to a suitable supply located above the level of the burner, so that the oil will readily flow thereto. The amount admitted to the burner is controlled by the cut-off Y, which is of any approved construction. In Fig. 8 I have illustrated a modified form of the burner, which differs from the form described.

The space between the arms J of the burner allows of the air passing upward on its way to the deflector. This is important when the drippings-receptacle is so arranged that the air cannot pass upward through it or outside of it, because the spaces between these arms

J in such instances afford the only passages for the air-draft.

In Fig. 11 I have illustrated substantially the same form of retort as shown in Figs. 2 and 3, but differently constructed in point of detail, being composed of short sections of the pipe *a'* and of couplings *b'*. In cleaning this form of retort the parts can be unscrewed and access readily had to the interior.

Referring to Figs. 3 and 10, the letter *c'* designates a cut-off stem, the end *d'* of which fits a seat, *e'*, in the vapor-tube R for the purpose of controlling the admission of vapor to the burner J. It has already been observed that the cut-off Y controls the quantity of oil that flows to the retort. But the cut-off *c'* controls the admission of vapor to the burner and prevents the escape of vapor into the stove before it can be ignited at the burner, for immediately the oil enters the retort the vapor enters the stove through the burner before it can be ignited, unless a cut-off is supplied between the retort and the burner. The term "rectangular retort" is intended to include a retort composed of straight sections, whether the sections occupy right angles or other angles toward each other.

It will be observed that the drip-receptacle prevents air from rising beneath upward along the inner wall of the stove, which might have the effect of preventing the flames from immediate contact with said wall.

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

1. In an apparatus for vaporizing and burning hydrocarbon oils, the combination, with a retort having an oil-supply pipe and a radial vapor-pipe, of a burner composed of a central hub-like body having an opening fitted to said vapor-pipe and a series of arms projecting from said body, an oil-fuel orifice and a water-fuel orifice, both running lengthwise through each arm, a water-vessel, and a water-pipe connecting it with the water-orifice, while the oil-orifices communicate with said vapor-pipe.

2. In an apparatus for vaporizing and burning hydrocarbon oils, the burner proper, consisting of a series of radial arms, each having two orifices lengthwise through it, and two central orifices communicating, respectively, with the sets of radial orifices.

3. In an apparatus for vaporizing and burning hydrocarbon oils, the combination, with a drippings-receptacle having an outer and an inner rim, a quantity of non-combustible absorbent therein between the rims, and an enlarged central opening within the inner rim, of a retort fitted above and supported by said receptacle, a vapor-tube leading from the retort radially and partly across the said opening, and a burner having a central portion fitted upon said vapor-tube, and radial arms with vertical air-spaces between them and

oil-orifices running lengthwise through them, substantially as shown and described.

4. In an apparatus for vaporizing and burning hydrocarbon oils, the following instrumentalities: a drippings-receptacle mounted in the lower part of a stove having a central air-opening and containing a non-combustible absorbent, a retort mounted upon said receptacle and having an oil-supply pipe, a burner mounted upon said receptacle and having two sets of radial orifices and vertical air-passages, and a deflector supported upon the burner, and air-openings under the deflector,

a water-reservoir mounted on the upper part of the stove, a water-pipe leading therefrom to one set of the radial orifices, a valve to control the admission of water to said pipe, and a tube connecting the retort with the other set of said orifices. 15

In testimony whereof I affix my signature in presence of two witnesses. 20

EUGENE O. DANIELS.

Witnesses:

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E. S. WALLACE.