

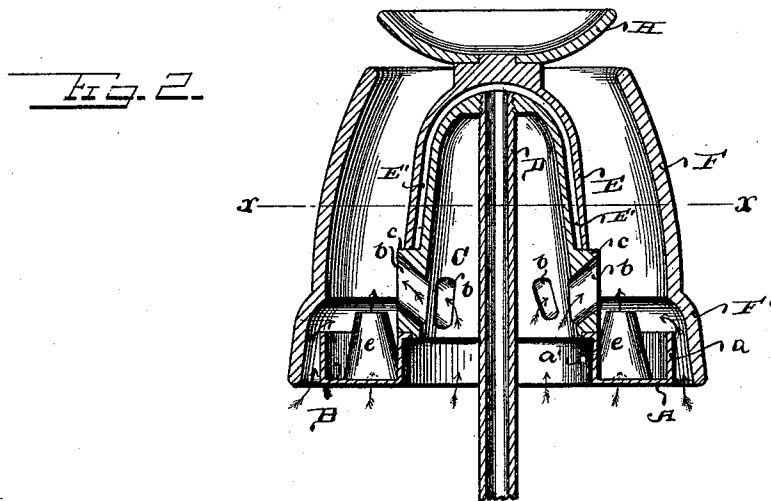
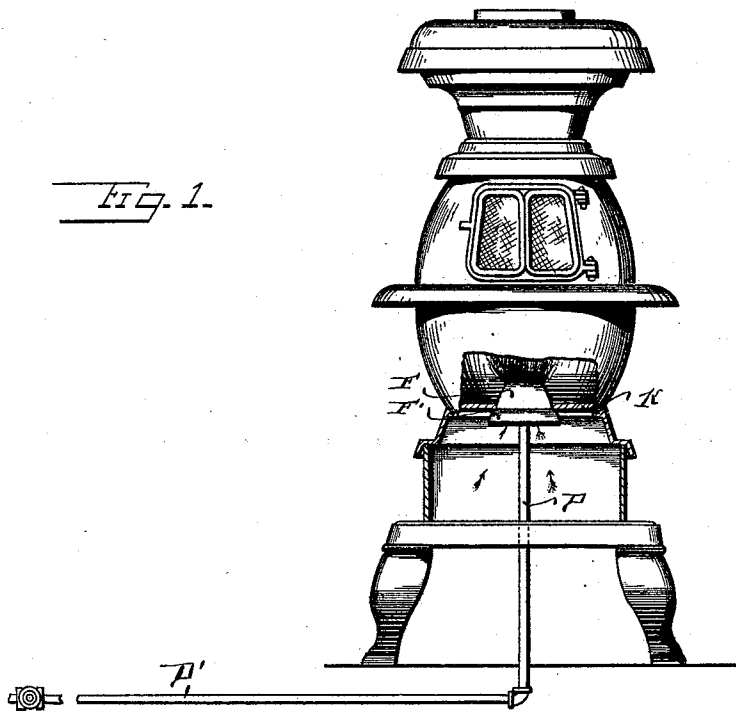
(No Model.)

2 Sheets—Sheet 1.

F. M. REED.
HYDROCARBON BURNER.

No. 496,282.

Patented Apr. 25, 1893.



WITNESSES

Jesse Heller.
Philip C. Masi

INVENTOR

Franklin M. Reed.

by E. W. Anderson

his Attorney

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Fig. 3.

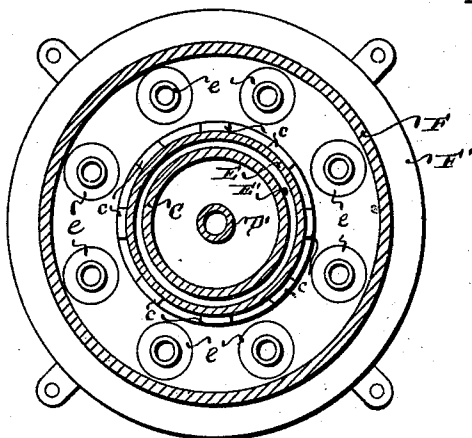


Fig. 4.

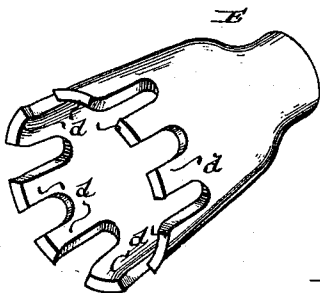


Fig. 5.

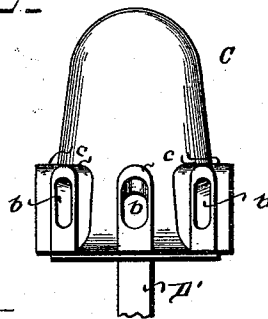


Fig. 6.

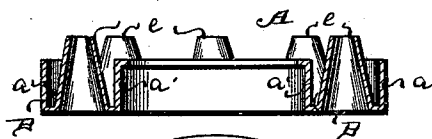
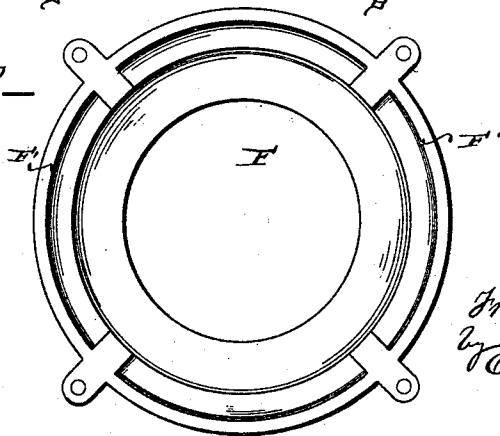


Fig. 7.



WITNESSES

Jesse Heller,
Philip A. Massi

INVENTOR

Franklin M. Reed
by E. W. Anderson
his Attorney

UNITED STATES PATENT OFFICE.

FRANKLIN M. REED, OF ANDERSON, INDIANA.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 496,282, dated April 25, 1893.

Application filed October 6, 1892. Serial No. 448,002. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN M. REED, a citizen of the United States, and a resident of Anderson, in the county of Madison and State of Indiana, have invented certain new and useful Improvements in Hydrocarbon-Burners; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a view of the stove with burner attached. Fig. 2 is a vertical section of the burner. Fig. 3 is a horizontal section on line $x x$ Fig. 2. Fig. 4 is a perspective view of the cap. Fig. 5 is a side view of the dome. Fig. 6 is a vertical section through the base and Fig. 7 is a bottom plan view of the outside shell.

This invention has relation to certain new and useful improvements in hydro carbon burners, in which either crude or refined petroleum is first converted into a vapor, which furnishes the fuel for combustion; and the invention consists in the novel construction and combination of parts, all as hereinafter described and pointed out in the accompanying claims.

The great object which has been sought to be attained in devices of this character is the perfect combustion of the oil or vapor, in order to produce an intensely hot flame free from smoke and gases. The difficulty in the accomplishment of this object has been to provide, first, suitable means to insure a high degree of vaporization of the oil, and second, to provide the proper means for the necessary admixture of air at the point of combustion, to thoroughly consume the heavier particles of the vapor.

The object of the present invention is therefore, first, to provide means such as will insure the subjection of the oil to a sufficient heat to cause a high degree of vaporization, and second, to so arrange the burner and parts, that the vapor as it issues into the combustion chamber, will be met by currents or drafts of air from different points in such a manner as to thoroughly break up the flame

and gases, and thereby secure a high degree of combustion.

A further object may be stated as consisting in means for the proper assemblage of the parts, and for facilitating their casting or manufacture.

These objects I attain by the arrangement illustrated in the accompanying drawings, and now to be described.

Referring to the accompanying drawings, the letter A designates the annular base of the burner, having two concentric vertical flanges a, a' , forming between them an oil pan B. The inner flange a' surrounds a circular opening through the base, over which is supported a generator dome C. Said dome is in the form of an elongated vertical cone or conoid, flattened and rounded at the apex, and having a hollow interior open at the bottom, through which extends the upward arm D of the oil-supply pipe D'. The upper end of said arm is screwed or otherwise secured in a circular opening in the apex of said dome, and terminates flush with the outer surface thereof. Through the lower portion of said dome extends a series of radial air ports or openings b , the mouths of which are projected beyond the surface of the dome, through radial lugs or projections c formed integral with said dome. The direction of said ports or openings from the interior of the dome is outward and upward, as indicated in the drawings.

I prefer to make the dome detachable from the base to facilitate casting, and in order that the parts may be readily separated if desired, the lower edge of the dome forms a tight joint with said base, and is secured thereto in any suitable manner.

E designates a cap for the generator dome, said cap being of similar form to that of the dome, and supported thereon in such a manner as to leave an intervening space or chamber E', the inner surface of the cap being usually separated from the outer surface of the dome about one-eighth of an inch, or so far as the different grades of oil may require. The lower portion of the cap is slotted to form a series of tongues d , which fit snugly around the lugs or projections c , through which extend the air ports b .

Extending upward through the oil pan of

the base, is a series of air tubes or passages *e*, located concentrically with relation to the ports *b*, and which are preferably cast integral with the base. These passages should preferably taper or contract from their lower ends upward. One of said passages is located opposite the space between each adjacent pair of the lugs *c*, and their upper ends should terminate a short distance below the lower ends of the tongues *e*.

F designates an outer surrounding shell or globe, open at its upper end, and having a cut-away portion around its lower portion which rests upon and is secured to the base. At the bottom of said globe or shell is an outward and downward lip or flange *F'*, projecting to the bottom of the oil pan, or below it, the space between said lip or flange and the oil pan, forming an external draft leading through the cut-away portion of the globe and concentric with the passages *e* and *c*. Said globe or shell may be either metal or fire clay, the latter being preferred.

Supported on the upper portion of the cap *E* is a spreader or deflector *H*, which is preferably of cup-shaped or concave form, as indicated. This also may be of either metal or fire clay.

The operation is as follows:—The oil is fed to the pipe *D'* from an elevated reservoir (not shown) and is forced by its own pressure through a suitable valve upwardly through the arm *D* to the mouth thereof, where it is discharged and flows downwardly over the surface of the dome, in the chamber *E'*, which forms the heating and vaporization chamber. Both the cap and the dome are intensely heated by the surrounding flames in the combustion chamber, so that the oil in flowing through this chamber undergoes a high degree of vaporization, and the vapor issues at the lower ends of the tongues *c*, which form the points of combustion, said tongues serving to contract the flames and throw them directly over the mouths of the air tubes or passages *e*, which as before stated are located directly at the centers of combustion. Consequently as soon as ignition takes place, the flames at once come into contact with the currents of air from said passages, and are thrown back against the dome, and laterally in front of the air-ports *b*, where they come in contact with other currents of air, and are directed outwardly against the shell or globe. They now come in contact with the external draft, and are again thrown back. By this operation, it will be apparent that the flames and gases are thoroughly broken up, so that a high degree of combustion is obtained, producing an intense flame free from smoke. Owing to this arrangement of draft, it will be observed that the burner is especially adapted to the heavier grades of oils.

The burner is designed to be placed in a stove in the manner illustrated in Fig. 1, through a circular opening in the bottom or base plate *K* of the combustion chamber of

the stove, and so arranged that all air that enters the stove must enter through the air passages and ports of the burner. That is to say, the base plate should be solid, except at the opening therein. As only the upper portion of the burner is inserted into the combustion chamber of the stove, it will be observed that the lower portions of the burner are protected from the intense heat produced.

In starting the burner into operation, the regulating cock in the feed pipe is opened to the proper extent, and the oil is allowed to issue into the oil pan, where it is ignited. Sufficient heat is soon obtained to heat the generating surfaces sufficiently to cause the conversion of the oil into vapor. Should it happen that all the oil does not vaporize, through excessive feed, or other cause, it will fall into the pan, and burn. If desired, a small quantity of asbestos or other refractory material may be placed in the pan.

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

1. In a hydro-carbon burner, the combination with the generator or vaporizer, and its vapor discharges, forming the points of combustion, of a series of upward draft passages at said points of combustion, and outer and inner concentric draft passages, substantially as specified.

2. The combination with the vaporizer and its discharges, forming the points of combustion, of a middle series of upward draft passages at said points of combustion, an interior series of upward and outward draft passages at the sides of said discharges, and the external inward draft passages, substantially as specified.

3. In a hydro-carbon burner, the combination with the base, and the generator or vaporizer supported thereon, of the vapor discharge openings forming the points of combustion, the upward draft openings or passages through said base at said points of combustion, the internal draft openings or ports at each side of said points of combustion, and the external draft passage, substantially as specified.

4. In a hydro-carbon burner, the combination of the annular base forming the oil pan, the central generating dome and its cap, the series of upward air passages through said oil pan, the air ports through said generator, and the external draft passage, substantially as specified.

5. In a hydro-carbon burner, the combination of an annular base forming an oil pan, a conoidal generating dome, having a series of projecting air ports at its lower portion, a cap for said dome and forming therewith an inclosed vaporization chamber, an oil supply, a surrounding globe or shell, a series of air passages through said pan, and an external draft passage between said pan and shell, substantially as specified.

6. In a hydro-carbon burner, the combina-

tion with the base, the generating dome supported thereon, and the oil supply for said dome, of the series of air ports opening from the open interior of said dome, the cap supported upon said dome and forming therewith an inclosed vaporization chamber, a series of vapor issuing orifices between said air ports a series of air passages through said base, a surrounding globe or shell, and an external air passage between said base and globe, substantially as specified.

7. In a hydro-carbon burner, the combination with the base forming the oil pan, the hollow generating dome supported on said base, and a series of air ports through the lower wall of said dome and through outward projections thereon, of the cap supported on said dome and forming therewith an inclosed vaporization chamber, a series of tongues on the lower portion of said cap fitting between said projections and forming the points of issue and combustion of the vapor, the upward air passages through the base at the center of said points of combustion, the surrounding shell or globe, and the air passage between said globe and the base, substantially as specified.

8. In a hydro-carbon burner, the combination with the annular base, the oil pan thereon, the central hollow conoidal dome, the projections thereon having the air ports there-through, the cap supported on said dome, and having the tongues fitting said projections, and forming the vapor issuing orifices and points of combustion, of the series of upward

air passages at said points of combustion, and the surrounding globe or shell, forming an air passage between itself and the base, and the spreader and deflector, substantially as specified.

9. The herein described hydro-carbon burner, comprising the base, its oil pan, the hollow conoidal generating dome, its oil supply, its radial projections having the ports therein, the cap having the tongues fitting said projections, the series of air passages through said oil pan, the surrounding globe or shell having the downward lip or flange forming an air passage between itself and the base, and the spreader supported on said cap, substantially as specified.

10. In a hydro-carbon burner, the combination with a base plate having an oil pan, a generator supported upon said base centrally of said oil pan, a series of air passages or ports through said oil pan, and a second series of passages or ports through the lower portion of said dome, of means whereby the vapor is caused to issue from said dome in proximity to the mouths of the passages through the oil pan, and between the passages or ports in the dome, and a surrounding shell or globe, substantially as specified.

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

FRANKLIN M. REED.

Witnesses:

NEWMAN P. HOWARD,
SAMUEL P. MOORE.