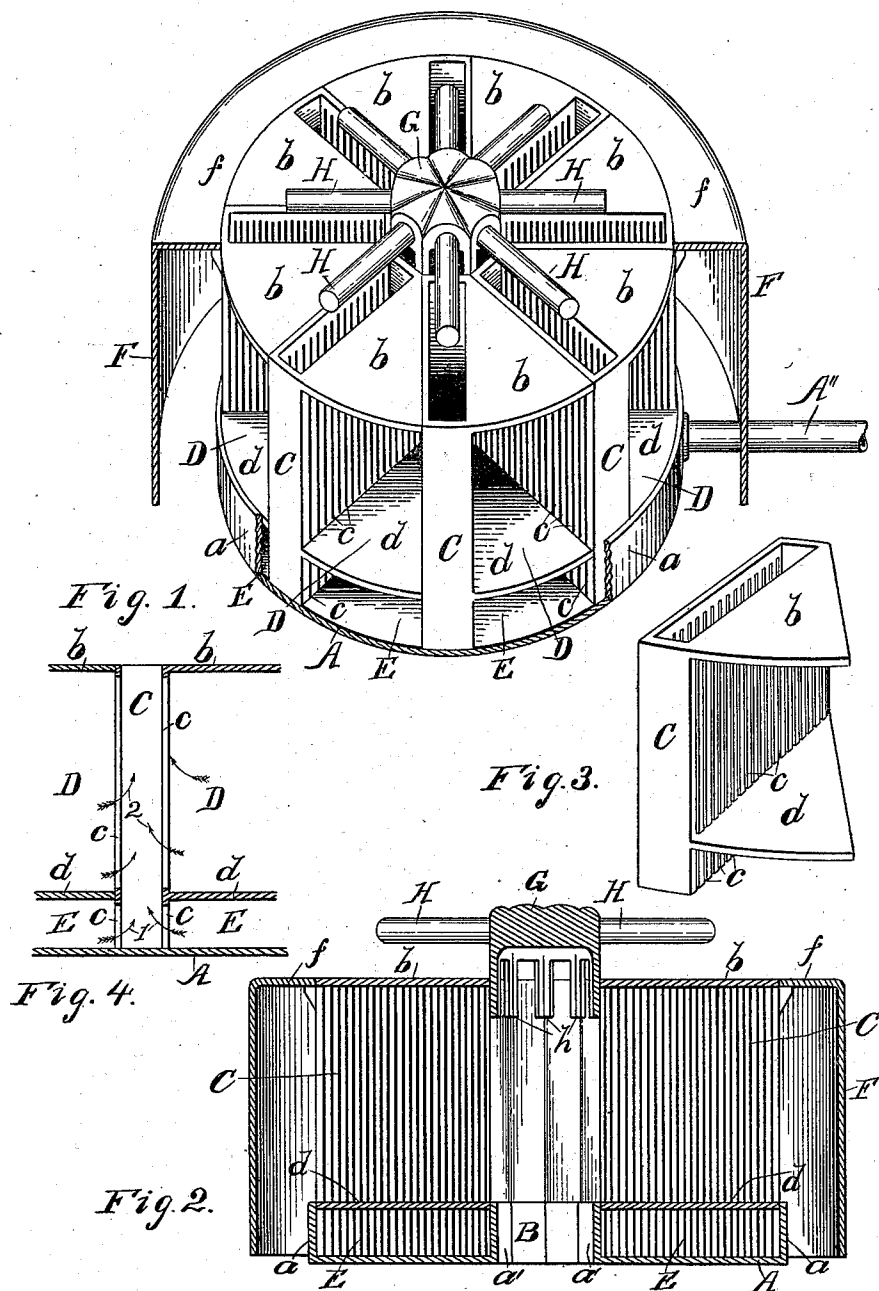


G. H. SHERMAN.
HYDROCARBON BURNER.

No. 560,654.

Patented May 26, 1896.



WITNESSES

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J. C. Drake

INVENTOR

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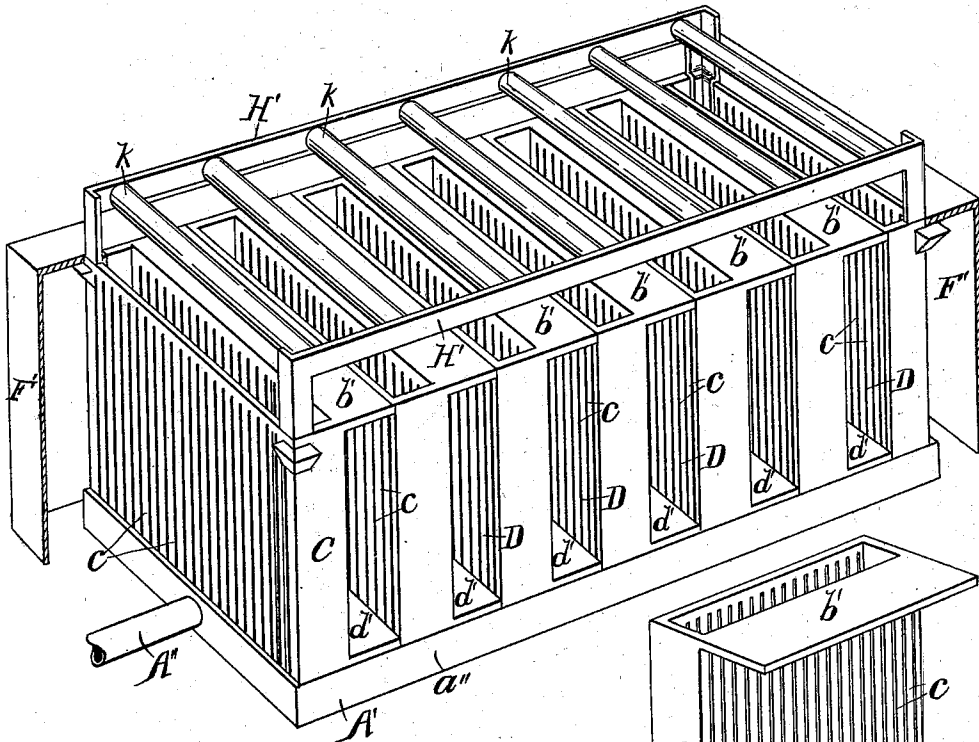


Fig. 5.

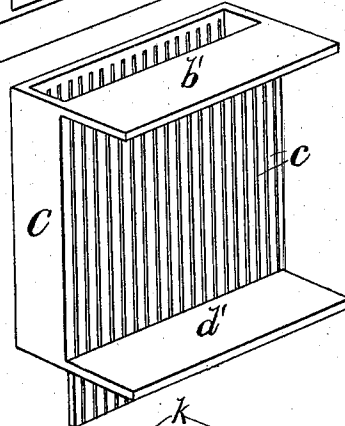
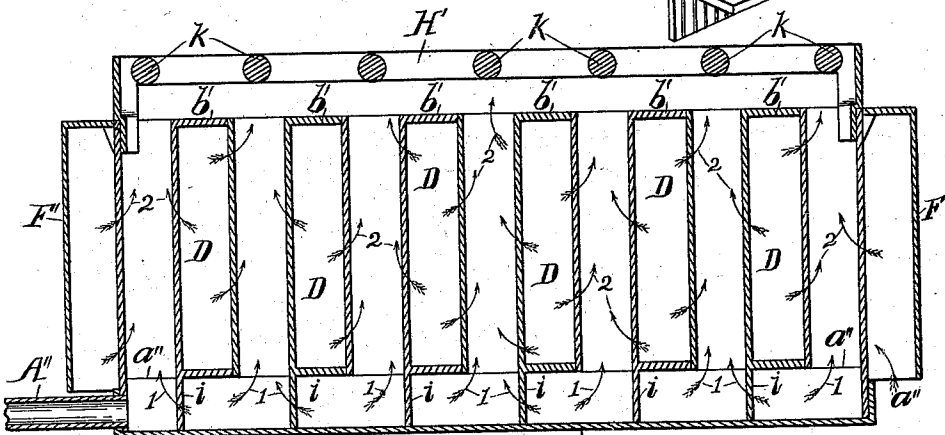


Fig. 6.



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Fig. 7.

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UNITED STATES PATENT OFFICE.

GEORGE H. SHERMAN, OF DETROIT, MICHIGAN.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 560,654, dated May 26, 1896.

Application filed May 28, 1894. Serial No. 512,822. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. SHERMAN, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, 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 the letters of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in hydrocarbon-burners; and it consists in the construction and arrangement of parts as hereinafter fully set forth, and pointed out particularly in the claims.

The object of the invention is to produce a burner of simple and inexpensive construction in which the arrangement is such as to provide for a perfect vaporization of the hydrocarbon fuel and for a thorough mixing of oxygen therewith, so as to attain complete combustion. This object is attained by the devices illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of my burner, portions of the pan and surrounding hood being broken away to more clearly show the arrangement of parts. Fig. 2 is a central vertical section through the burner. Fig. 3 is a perspective view of one of the tube-sections of the burner. Fig. 4 is a detail in transverse vertical section through one of the tubes in the burner. Fig. 5 is a modification in perspective, showing the burner in oblong rectangular form. Fig. 6 is a perspective of one of the tubes thereof. Fig. 7 is a vertical longitudinal section through the burner shown in Fig. 5.

In the application of this improved burner to a gasolene-stove or for the ordinary purposes of cooking a circular form is preferred, as shown in Figs. 1, 2, and 3, in which A designates a circular pan, of thin metal, with which the fuel-supply pipe A' communicates, which is provided with a vertical circumferential flange *a* and with a central vertical flange *a'*, through which said supply-pipe passes, as clearly shown in Fig. 7, around a

central opening B therethrough. Seated in said pan, with their lower ends resting on the bottom thereof and arranged in radial order, is a series of vertical oblong tubes C, the opposite sides of which are provided with open slots *c*, or perforations, if desired, which extend from the top to the bottom thereof. These tubes stand diametrically of the pan within the vertical flanges *a* and *a'*, their inner edges converging around the central opening B therein, forming a vertical flue or opening through the center of the burner. The purpose of extending the sides of the perforated tubes to the bottom of the pan is to provide for allowing the vapor to distribute itself equally over the entire surface of the pan by partially shutting off the air communication below the bottom of said tubes, without which construction, when priming, or in the initial lighting of the burner, the rush of air through the tubes and along the bottom of the pan toward the initial point of combustion or the greater volume of flame would carry the vapor with it, resulting in an unsatisfactory flame in one or two tubes only nearest the point of fuel supply, whereas by extending the perforated wall of the tube to the bottom of the pan the vapor is permitted to spread over the entire surface and burn equally from each of said tubes.

The tubes C are closed on their outer and inner edges, and when arranged as shown in Fig. 1 they form a burner consisting of a series of radial tubes with interposed triangular air-spaces D, which are open on their outer face and converge toward the center of the burner. These air-spaces are covered at the top by means of triangular caps *b*, extending laterally between the upper ends of the tubes C, and which may be formed integral with said tubes, as shown. Dividing said air-spaces horizontally are the plates or diaphragms *d*, which, like the caps *b*, may be formed integral with said tubes, and which extend laterally between the sides thereof on a plane with the upper edges of the flanges *a* and *a'* of the pan, thereby forming a closed vapor-generating chamber E below said dividing-plates, from which the generated vapor can pass only into the tubes C through the perforations in the sides thereof.

Surrounding the burner, concentric there-

with, is a circular hood F, having a lateral annular flange *f*, which meets the upper rim of the burner, forming an air-space between the hood and burner, closed at the top. This exterior hood serves as a deflector to direct the air into the open air-spaces D between the tubes C, from which air-spaces it is deflected by the caps *b* into said tubes through the slits or perforations in the sides thereof, thereby supplying sufficient oxygen to the hydrocarbon vapor rising through the tubes to insure complete combustion. It will now be understood that the hydrocarbon fuel entering the pan A through the supply-pipe will spread over the entire surface thereof, and because of the area exposed will quickly vaporize, which vaporization is greatly accelerated when said pan becomes heated. This vapor enters the tubes C at the base, through the perforations therein below the dividing-plates *d*, as shown by the arrows 1 in Figs. 3 and 7, and rising in said tube is thoroughly mixed with the air-currents entering the tubes from the air-spaces D through the perforations in the sides thereof, as shown by the arrows 2, whereby perfect combustion is assured, the flame burning upward from the end of said tubes. To provide for spreading the flame, a hub G is employed, having radial arms H, that project over the ends of the tubes C, said spreader being retained in place by the fingers *h*, depending from said hub, which enter the central opening through the burner. Said opening also serves as a central draft for the burner, which supplies air to the flame at the upper ends of said tubes.

It is sometimes desirable to have a burner of this character constructed in an oblong or rectangular form, as shown in Figs. 5, 6, and 7, for heating bakers, the water in washboilers, and for other uses where a round burner is not convenient. This rectangular burner is formed by assembling any desired number of the tubes C in a suitable pan A', said tubes resting on the bottom of the pan and extending transversely thereof, being located such distance apart as to form the intermediate air-spaces D, extending transversely of the burner and communicating with the tubes C through the perforations in the sides thereof, said air-spaces being covered at the top by the rectangular caps *b'*, extending between the ends of the tubes and being divided horizontally near the base by the lateral plates *d'*, which extend between the sides of the tubes on a plane with the edge of the vertical marginal flange *a''* of said pan, forming below said plates the vapor-generating chambers E, communicating with said tubes at the bottom. But one side of said perforated tubes extends into the pan in this construction, as shown at *i* in Figs. 6 and 7, forming a leg or support for said tubes and permitting the vapor or hydrocarbon fuel to distribute itself freely over the bottom of the pan and to burn equally from all of said tubes, in which it is thor-

oughly supplied with air from the spaces D, which enters the tubes through the perforations in the sides thereof. It will therefore be seen that the two forms of burners shown are alike in every feature except the immaterial one that the air-spaces in the rectangular burner cross from side to side and are open at each end, the operation of the burners being exactly the same.

Inclosing the rectangular burner is a hood F, which serves to divert the air into the spaces between the tubes in the same manner as the hood shown in Figs. 1 and 2.

To provide a suitable spreader for the rectangular burner shown in Figs. 5 and 7, a frame H' is employed, which is mounted upon the burner and carries the cross-rods *k*, which extend transversely above the openings of the tubes.

In burning hydrocarbon fuels of greater density, such as kerosene, a layer of asbestos or other fibrous material may be placed upon the bottom of the pan to assist in igniting the fuel.

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

1. The combination of the flat-bottom pan, the perforated tubes located therein having a perforated wall resting on the bottom of the pan and so arranged as to form air-spaces between them closed at their upper ends, the horizontal plates extending laterally between said tubes near their lower ends and dividing said air-spaces from the pan.

2. In a hydrocarbon-burner, the combination of the flat-bottom pan having a vertical rim, the perforated tubes seated in said pan and arranged to form interposed air-spaces between them, said tubes having the upper and lower lateral plates formed integral with the wall thereof, said lower plates extending horizontally between said tubes on a plane with the rim of said pan and said upper plates extending in like manner between the upper ends of said tubes.

3. In a burner, the combination of the flat-bottom pan, the perforated tubes seated in said pan and resting upon the bottom thereof, said tubes being so arranged as to form intermediate air-spaces closed at the top and communicating with said tubes through the perforations in the sides thereof, the transverse plates extending between said tubes near their lower ends forming the closed vapor-chambers below said plates which communicate with the base of said tubes through the perforations in the wall of the tubes at their lower ends, and the deflecting-hood around said burner.

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

GEORGE H. SHERMAN.

Witnesses:

E. S. WHEELER,
H. R. WHEELER.