

(No Model.)

H. RUPPEL.
HYDROCARBON BURNER.

No. 576,229.

Patented Feb. 2, 1897.

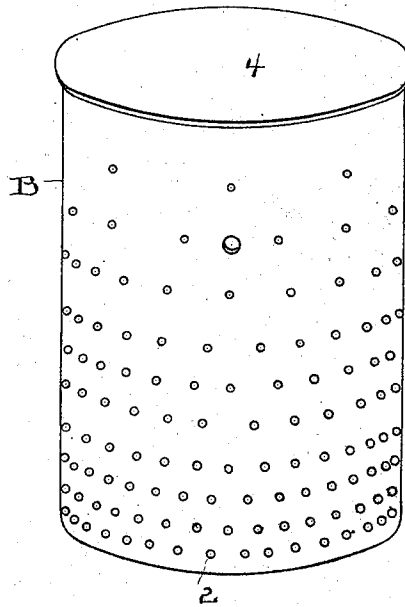
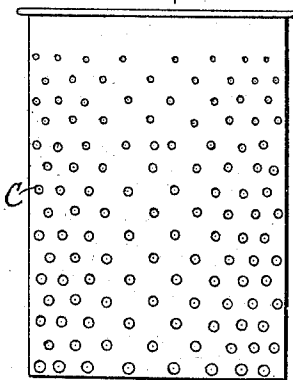
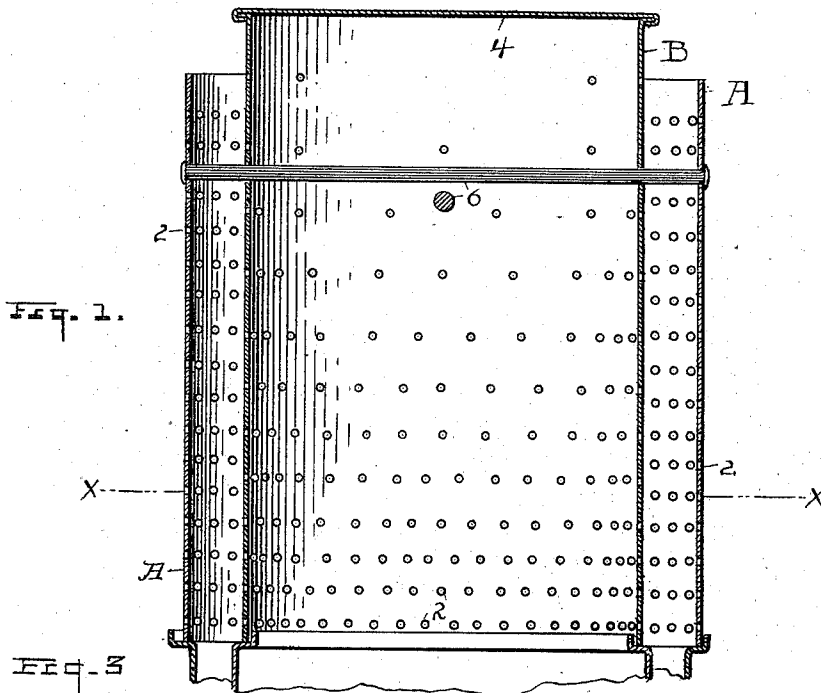


Fig. 2.

ATTEST

R. B. Moser
H. E. Menden

INVENTOR

Henry Ruppel

By H. J. Fisher

ATTY

UNITED STATES PATENT OFFICE.

HENRY RUPPEL, OF CLEVELAND, OHIO.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 576,229, dated February 2, 1897.

Application filed October 26, 1896. Serial No. 610,046. (No model.)

To all whom it may concern:

Be it known that I, HENRY RUPPEL, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Hydrocarbon-Burners; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention has reference to hydrocarbon-burners of the variety in which perforated combustion-tubes are used. It is well known that it is desirable in this class of burners to not only have an ample supply of fresh air supplied to the combustion-chamber between the two burner or combustion tubes, but also to have the air thus supplied from the inside fed largely and mainly into the lower portion of said chamber, where the principal combustion of the vapors or gases takes place, and especially is this true in burners in which wicks are employed, as in the now common kerosene-burners. Hitherto the chief means relied on for forcing the supply of air to the bottom of the combustion-chamber has been a diaphragm of some kind or its equivalent arranged within the inner tube and generally fairly well toward the lower end of said tube and in such position and of such construction as to crowd the supply of air to the lower series of holes. In some instances these diaphragms are more or less punctured or perforated to allow a measure of air to pass through and supply the chamber at higher planes; but in any event all such and kindred constructions, whether directly of the diaphragm variety or not, have been placed in the inner tube to obstruct the upward flow of the air above the lower portion of the combustion-chamber.

My invention has in view the same object substantially as the constructions I have referred to, but I accomplish the result by entirely different means, as clearly shown in the drawings and made clear in the description.

Figure 1 is a vertical sectional elevation of a pair of associated combustion-tubes embodying my invention. Fig. 2 is a perspective elevation of the inner one of said tubes alone. Fig. 3 is an elevation of a modified

form of inner tube in which the inlet-openings for air gradually diminish in size from bottom to top, thereby accomplishing the same result practically as by the construction shown in Fig. 2.

A represents the outer combustion-tube of a pair of cylindrical tubes here shown, but these tubes might have other forms and still be within the spirit of my invention, such, for example, as would be adapted to a straight-wick or vapor chamber instead of a circular one. This outer tube is uniformly and evenly perforated from top to bottom, as is usual in this class of tubes; but the inner tube has the original and novel feature of a uniform and even disposition of perforations about the lower portion of the tube for a distance of about one-fourth or one-fifth from its bottom, when the perforations begin to grow fewer and the unperforated space or area relatively larger, and this continues at about an even ratio to the top of the tube, where the tube remains intact and no perforations whatever are made. Then to complete the construction the upper end of the tube B is closed with a cap or cover 4, preferably placed over the end of the tube and flanged about the edge thereof, so as to be fixed permanently in place. In this way I accomplish all that can be accomplished by a diaphragm spanning the inner tube and choking back the main volume of air, because in this way the inflow of air to the combustion-chamber is graduated by the location and arrangements of the perforations 2, assisted by the cover 4. The said cover effectually prevents any inside air from escaping except through said perforations, and hence the perforations admit air according to their position and size. Where they are largest or most numerous the most air will enter, and where they are smallest or fewest the least air will enter. Up to a certain point, say to about line *xx*, Fig. 1, the perforations are about as usual in these tubes, but from that point upward they decrease in number or size, so that a gradually-decreasing volume of air is admitted to the tube until the top is reached, when it is cut entirely or practically off. The theory of this arrangement of the perforations, of course, is the well-known one that the best combustion is obtained by taking it at the point of vapor

or oil supply, so that to insure a perfectly blue flame from first to last a large volume of air must be supplied at the base of the flame and then sufficient air admitted to the combustion-chamber above that belt to ignite and consume any traces of vapor that may be carried along with the flame to higher levels. Ultimately the point is reached where combustion is completed and no traces of vapor remain, and as this occurs there is no need of further oxygen and hence no perforations. This construction has the further advantage of forming an air-chamber within the inner tube, in which the air is heated before it enters the combustion-chamber, thus preparing it to enter at once into chemical combination with the carbon and insuring materially better results than would be possible with cold air.

The two tubes A and B are shown here as connected by cross-rods 6 at right angles to each other, as usual, but this is not material to the present invention. Neither is it material what the arrangement of the tubes may be, provided they be arranged to utilize the inner tube, constructed and perforated substantially as shown for the purpose set forth.

Obviously it is immaterial whether inner tube B or C or its equivalent be used, the object in any case being to admit relatively more air at the bottom than at the top and graduating the inlets between these extremes.

In either Figs. 2 or 3 there are gradually-decreasing air-inlet openings.

What I claim as new, and desire to secure by Letters Patent, is—

1. In hydrocarbon and like burners, a combustion-tube constructed with air-inlet openings having an aggregate inlet area relatively greater at the bottom than toward the top of the tube, substantially as described.

2. A set of combustion-tubes for vapor and gas burners, and the inner tube provided with air-inlet passages in which the aggregate area of the said passages gradually diminishes from the bottom toward the top of the tube, substantially as described.

3. A set of perforated combustion-tubes for gas and vapor burners provided with air-inlet openings, and the inner of said tubes having its principal inlet area about the bottom thereof and substantially closed across its top, substantially as described.

4. The combustion-tube substantially as shown and described, said tube provided with air-inlet openings gradually decreasing in number from the bottom toward the top of the tube, substantially as described.

Witness my hand to the foregoing specification this 14th day of October, 1896.

HENRY RUPPEL.

Witnesses:

H. T. FISHER,

R. B. MOSER.