(No Model.)

J. H. WHITBURN.

HYDROCARBON BURNER.

No. 418,481. Patented Dec. 31, 1889.

Fig. 1.

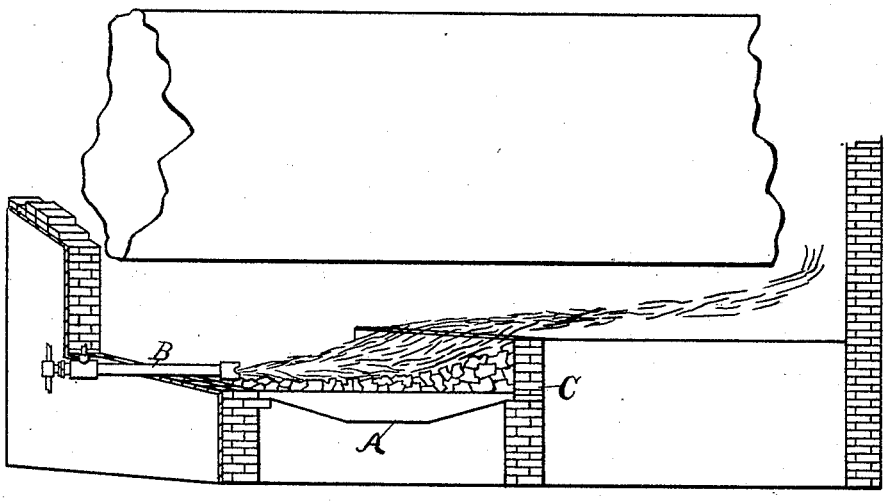


Fig. 2.

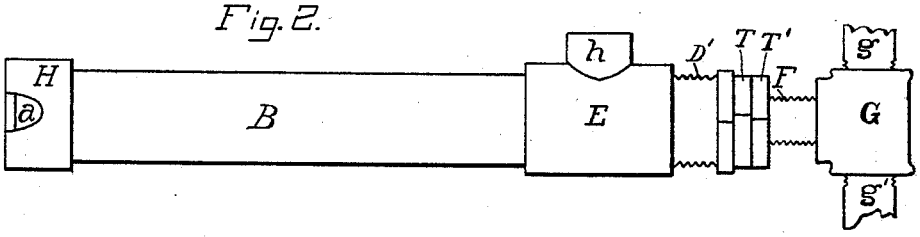


Fig. 3.

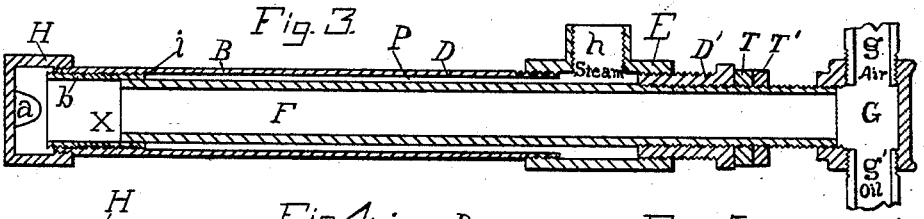


Fig. 4.

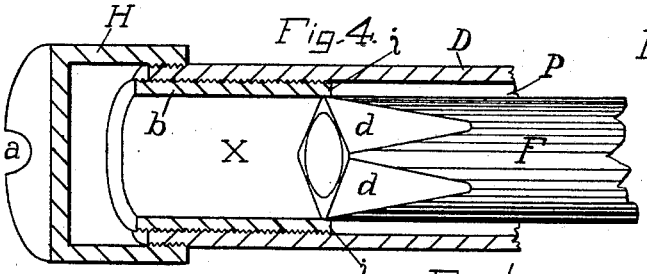


Fig. 5.

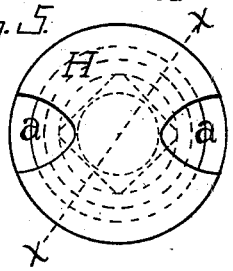
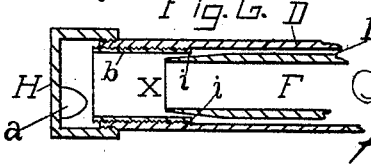


Fig. 6.



Witnesses
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UNITED STATES PATENT OFFICE.

JAMES H. WHITBURN, OF LOS ANGELES, CALIFORNIA.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 418,481, dated December 31, 1889.

Application filed April 25, 1889. Serial No. 308,618. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. WHITBURN, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Improvement in Hydrocarbon-Burners, of which the following is a specification.

One object of my invention is to produce a hydrocarbon-burner which may be made to spread the flame in a sheet beneath the boiler and may be made to direct the flame to one side or the other of the furnace, as may be desired.

A further object is to secure complete combustion at all times, thus avoiding the puffing or blowing back which is an objectionable feature in burners of this class.

I accomplish these objects by means of the device described herein and illustrated in the accompanying drawings, in which—

Figure 1 represents my improvements in position in a furnace beneath a boiler, portions of the furnace-wall and boiler being broken away for convenience of illustration. Fig. 2 is a side view of my burner. Fig. 3 is a longitudinal vertical axial section of the same. Fig. 4 is a perspective view of a section of the front end of the burner, the pipe F being drawn back its extreme length to admit a large amount of steam. Fig. 5 represents the end of the burner, showing the discharge-openings. Fig. 6 is a section on line *x x*, Fig. 5.

My invention consists of the peculiar construction of the front end of the burner, which vaporizes the oil and injects it into the furnace, and in the combination, with a mass of loose pieces of incombustible substances arranged upon the open grate of an ordinary furnace, of a hydrocarbon-burner arranged to project a sheet of flame and vapor against the surface of the mass, as hereinafter more particularly set forth, whereby air is more perfectly introduced to the flame, and whereby such substances are caused to produce a more perfect combustion of the oil.

My invention relates to that class of hydrocarbon-burners by which air and oil are introduced into the burner through a revoluble axially-adjustable open-ended centrally-located pipe surrounded by an annular steam-chamber opening at the open end of the revoluble pipe into a mixing-chamber, from which the vapor escapes into the furnace.

My invention consists in forming on the end of the revoluble oil and air pipe four beveled facets arranged opposite each other, providing the front end of the mixing-chamber with a horizontally-arranged series of discharge-holes, and combining such chamber and pipe with each other, as hereinafter more fully set forth.

My invention also consists in the combination of a hydrocarbon-burner with a mass of broken brick or other incombustible matter arranged upon the open grate-bars of an ordinary furnace in a plane oblique to and extending across the plane of the flame from such burner, whereby the vaporized oil is broken up and mingled with the air, and whereby at the same time air is admitted from beneath to facilitate the combustion of the vaporized oil as it is broken and mingled with the air.

In the drawings, A represents one of the grate-bars, B the burner, and C the bridge of the furnace.

D represents the pipe forming the steam-chamber P about the interior or oil and air pipe F. A pipe *h* and T-coupling E connect the interior of pipe D with a steam-supply, and H is a cap, provided with a horizontally-arranged series of exit-holes *a a*, to allow the vapor to escape. The rear end of air and oil pipe F is screwed into a bushing D′, which is screwed into the rear of the T-coupling E, so that the beveled end of F is held fixed within the steam-pipe D coaxial therewith. The rear end of F is screwed into a coupling G, provided with an air-pipe *g*, entering at the top, and an oil-pipe *g′*, opening into it at the bottom.

T T′ are lock-nuts, by means of which F is clamped against D′.

The discharge end of the air and oil pipe F has four beveled facets *d*, arranged oppositely in rectangular form, and a bushing *b* is screwed into the discharge end of pipe D, so that the rear end thereof will form a jog or contraction *i* of the steam-pipe D, into which the end of the pipe F is inserted, so that the jog of the contraction is at a point between the ends of the facets—that is to say, the chamber around the pipe F is suddenly contracted around the interior pipe F where it

is beveled. This construction gives a peculiar form to the steam-escape passages, each of which is the frustum of a parabolic conic section with the base outward or forward. When the pipe F is rotated, the relation of these passages to the exit-holes *a a* is changed. When the pipe F is turned so that two of the junction-points between the facets *d d* are arranged horizontally, then the vapor is so discharged through the holes *a a* as to be projected in a horizontal sheet beneath the boiler. By turning the pipe F so as to bring the facets into a different position relative to the holes *a a* the flame is caused to flare sidewise, and I find that by turning it thus I can direct nearly all the flame to one side or the other of the furnace. By turning the pipe F its screw-threads cause it to move back and forth, thus changing the size of the passages from the steam-chamber, so that the amount of steam admitted to the chamber within the cap can be regulated. The sheet of flame is projected from the burner by the jet of steam in a horizontal plane and strikes the inclined face of the mass of broken brick or other incombustibles, and is driven into the interstices between the pieces which form the mass. The vapor is in this manner brought into more intimate contact with the air and is commingled with it more thoroughly than is possible by any other means, the heated mass of broken bricks inducing a strong upward current of air through the heated mass from the open grate-bars below. This superheats the vapor and air, and thus causes perfect and complete combustion. The flame is then caused to pass upward toward the boiler by a natural draft and is not projected against it with such force as to burn it or cause it to blister.

Now, having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the pipe D, bushing *b*, the oil and air pipe F, provided at its discharge end with beveled facets *d*, arranged oppositely in rectangular form, and the cap H, provided with a series of horizontally-arranged discharge-holes *a*.

2. In a hydrocarbon-burner, the combination set forth of the steam-chamber contracted at its discharge end, the oil and air pipe F, provided at its discharge end with beveled facets *d*, arranged oppositely in rectangular form, and the cap H, provided with a series of horizontally-arranged discharge-holes *a*.

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Witnesses:
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