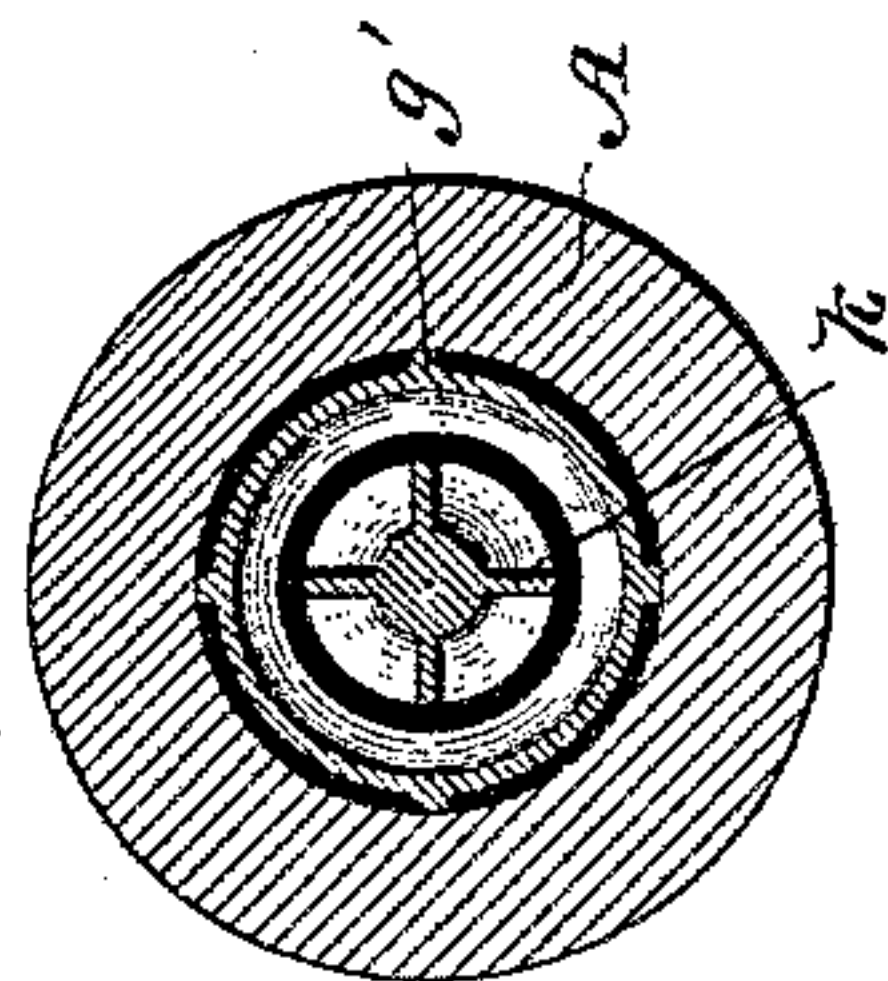
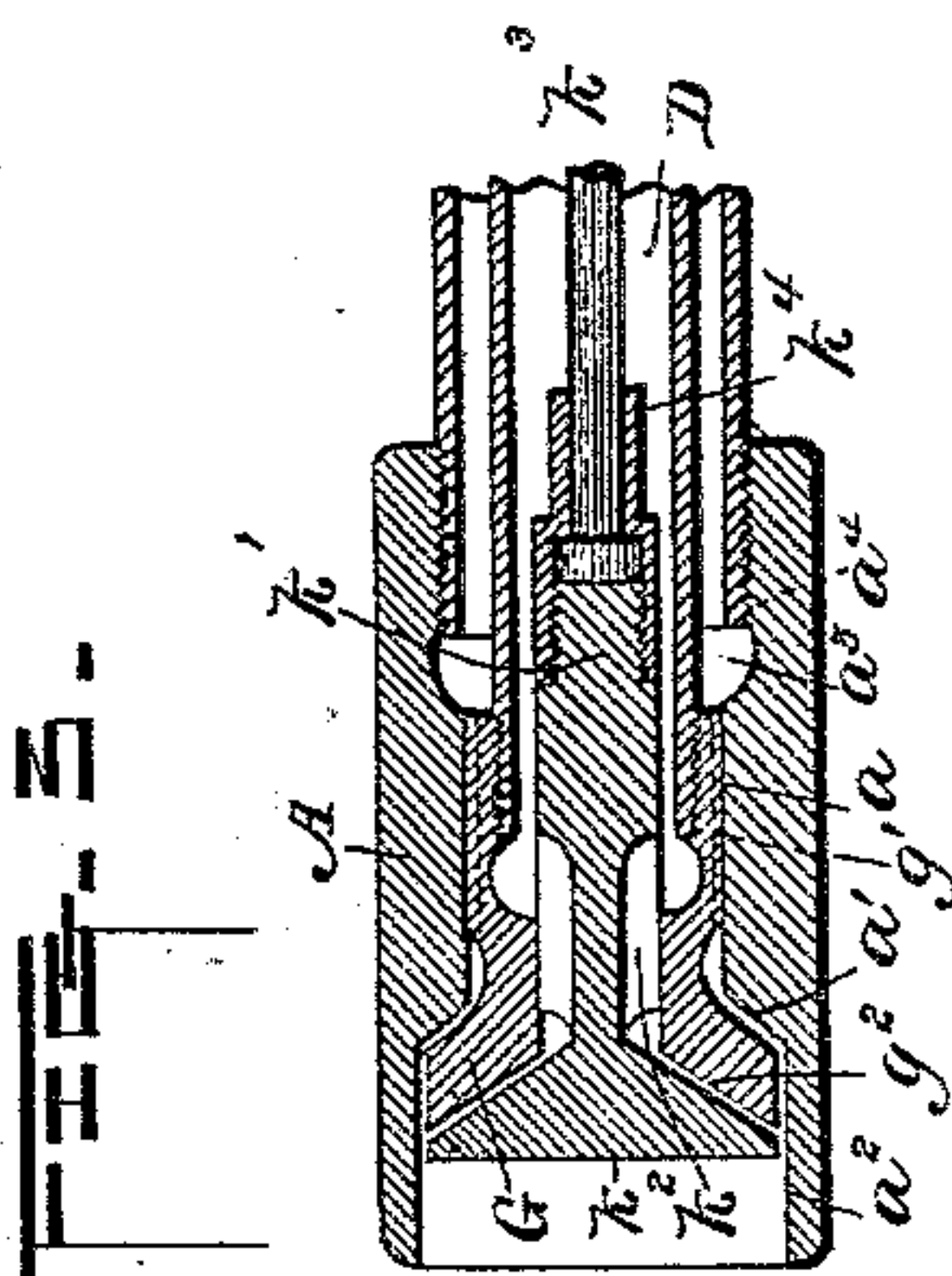
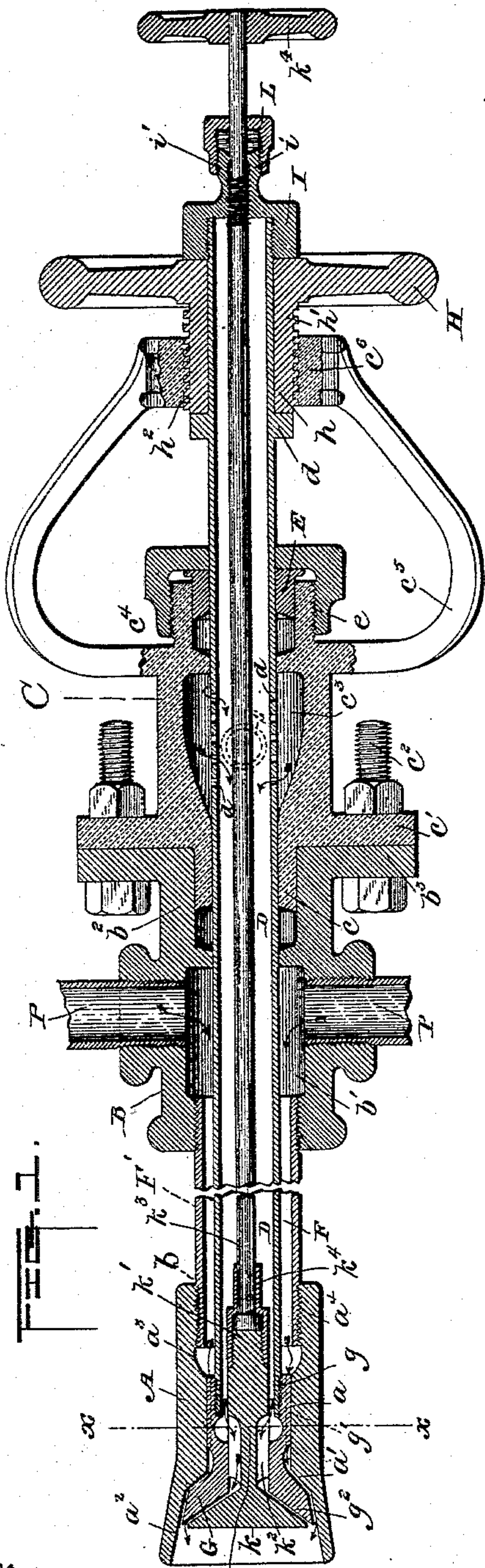


(No Model.)

W. L. FISHER.
HYDROCARBON BURNER.

No. 401,149.

Patented Apr. 9, 1889.



Witnesses,

L. A. Comer Jr.

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His Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM L. FISHER, OF FLINT, MICHIGAN, ASSIGNOR TO THE FISHER OIL BURNER COMPANY, OF SAME PLACE.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 401,149, dated April 9, 1889.

Application filed May 16, 1888. Serial No. 274,035. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. FISHER, a citizen of the United States, residing at Flint, in the county of Genesee and State of Michigan, have invented certain new and useful Improvements in Hydrocarbon-Burners; and I do hereby 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.

My invention relates to an improvement in vapor-burners.

The object is to provide a burner in which the steam at a high temperature may impinge upon a thin sheet of oil in such a manner as to spread the mixed steam and oil over an extended area, and thereby insure the complete combustion of the oil and furnish a flame of increased size and heat.

A further object is to provide a burner of the above character in which the steam and oil may be regulated with precision and with great economy.

With these ends in view my invention consists in certain features of construction and combination of parts, as will be hereinafter described, and pointed out in the claim.

In the accompanying drawings, Figure 1 is a view of the burner in longitudinal central section. Fig. 2 is a cross-section through line *xx* of Fig. 1, and Fig. 3 is modification.

The casing of the burner is preferably formed in three sections—viz., the section A at the end of the burner where the vapor is ignited, the middle section, B, and the opposite end section, C. The casing-section A has its central bore, *a*, enlarged at its outer or discharge end, the preferable form being that shown in Fig. 1, where the central bore is first enlarged gradually, forming walls *a'* at an angle of about forty-five degrees to the axis of the burner, and subsequently enlarged less rapidly, forming walls *a''*, which only diverge from the axis of the burner five degrees, (more or less,) and extend beyond the burner to form a dash, against which the oil and steam impinge. The opposite end of the said casing-section A also has its bore enlarged, as shown at *a³*, and provided with an internal screw-thread, *a⁴*, extending from its end a sufficient

distance to form a secure joint between it and the screw-threaded end *b* of the steam-tube *F'*, which connects the sections A and B together. The bore of the middle section, B, at its end toward the section A corresponds in size with the central portion of the bore of section A; but it is enlarged along its middle portion to form a steam-chamber, *b'*, and at its opposite end to receive the end of the casing-section C. The end *c* of the section C forms the male and the end *b''* of the section B the female gland of a stuffing-box about the oil-tube D, and the two glands are secured together through their lateral flanges *b³* and *c'* by suitable bolts, *c''*, as is usual. The casing-section C near its end toward the section B is provided with an enlarged bore, *c³*, forming an oil-chamber, and a short distance from the oil-chamber *c³* it is again enlarged to receive the male gland *c⁴* of a stuffing-box, E, the latter being provided with an internal screw-threaded portion, *e*, adapted to be screwed onto the threaded end of the tubular portion of the section C, as shown.

A skeleton section, *c²*, in the present instance heart-shaped, connects the tubular portion of the section C with the opposite end, *c⁶*, of the said section, the latter being essentially an internally-screw-threaded collar.

The oil-tube D extends centrally through the bores of the several casing-sections, and is made sufficiently smaller than the bore to form an annular steam-chamber, F, between it and the interior walls of the casing. The stuffing-boxes above referred to fit tightly around the tube D, but permit it to slide longitudinally through them. Along its portion which corresponds with the oil-chamber *c³* the tube D is provided with perforations *d* through its walls, which admit the oil into it from the chamber. The latter is supplied from any convenient source through a supply-pipe, S. (Shown in dotted lines in Fig. 1.) The end of the oil-tube toward the end of the casing where the oil is ignited is provided with a tubular valve, G, which is fastened to the end of the tube, preferably by means of an internal screw-thread, *g*, which engages a corresponding thread on the end of the tube. The stem of the valve is somewhat smaller than the bore of the casing-section A to per-

mit the passage of steam around it, and it is held in position centrally within the casing-section by means of wings or feathers g' , which project from its stem. The discharge end of the valve is spread out to nearly fill the enlarged end of the casing, and is shaped to conform with the walls a' and a'' of the casing, so that when slid back from the end of the casing it may be made to seat firmly on the wall or valve-seat a' and shut off the escape of steam. The bore at the free end of the valve is enlarged, forming a flat conical-shaped opening, its walls forming a conical valve-seat, g'' , for the oil-valve, as will hereinafter appear. The opposite end of the tube D is fitted with an operating device as follows: A hand-wheel, H, has an extended hub, h , the bore of which is adapted to loosely receive the tube D, and the exterior of the hub is provided with a screw-thread h' , adapted to register with a screw-thread, h'' , on the interior of the end c^6 of the casing-section C. The hand-wheel and its screw-threaded hub are secured on the tube D between a collar, d , and stuffing-box I, which screw onto the end of the tube. Thus as the hand-wheel H is turned its hub h will travel longitudinally through the end c^6 of the casing-section C, and will carry with it the tube D and its valve G to regulate the discharge of steam around the free end of the valve. The stuffing-box I not only serves to hold the hand-wheel in place on the tube, but serves together with the valve-rod as a closure for the end of the tube, and is provided with a stem, i , having a central longitudinal perforation, i' , through which the valve-rod for operating the valve extends.

The oil-valve K has a flat outer face and a conical inner or under face, k , fitted to seat on the conical seat g'' of the valve G. Its stem k' is smaller than the bore of the valve G, to admit a flow of oil around it, and it is centered within the stem of the valve G by means of wings or feathers k'' . The valve-stem k' is secured to the end of the valve-rod k^3 by a suitable coupling, k^4 . The valve-rod k^3 where it passes through the stem i of the stuffing-box I is screw-threaded to register with a corresponding screw-thread in the wall of the perforation i' . The cap L of the stuffing-box I screws onto the end of the stem i , and the valve-rod k^3 projects through the cap and is provided with a handle, k^4 , for turning it. Thus as the valve-rod is turned the valve K will be moved away from or toward its seat and the discharge of oil regulated with the greatest precision. The length of the tube D should be such that the valve G may be raised from its seat out of the end of the casing A to blow out any obstruction which may tend to clog the burner. The steam may be admitted to the steam-chamber b' through one or more steam-pipes, P, and should be superheated before entering the chamber. The burner as thus constructed is capable of con-

suming crude oil with the most favorable results, the superheated steam being continually under pressure around the oil-pipe, and thereby keeping the oil at a high temperature.

The arrangement of the valves and casing-section A is such that the oil as it escapes in a thin sheet outwardly toward the flaring walls of the casing will be caught by the sheet of steam around the interior of the casing and spread over a great area in a light vapor, which will insure perfect combustion and will afford a great extent of flame. This is largely due to the course and direction given to the oil and steam by the discharge-openings formed by the construction and arrangement of the different parts of the burner. The flow of escaping steam is uninterrupted by eddies caused by portions of the steam impinging against other portions. This is sought to be avoided, as such eddying would cause retardation of the steam, and a greater or less deposit of oil upon the dash surrounding the steam and oil outlets would result, and a consequent loss of effective work on the part of the burner would necessarily follow. It will be seen that the discharge-passages of both the steam and oil incline outwardly, and that one of the passages has a greater angle of inclination than the other, so that the two gradually approach each other.

The modification shows the walls a'' of the casing about parallel with the axis of its bore, instead of flaring. This construction gives fair results under certain conditions where a very great extent of flame is not of material advantage; but the preferred form for general application is that shown in Fig. 1, where the walls a'' are slightly flaring.

I am aware that it is not new to make a vapor-burner with a steam-passage surrounding an oil-passage with an annular discharge-passage deflecting the steam toward the axis of the burner, and such construction I do not claim; but

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

In a vapor-burner, the combination, with an outer casing having a portion of its inner wall inclined outwardly to form a valve-seat and a portion outside of said valve-seat at a different angle forming a dash, of a steam-valve and an oil-valve within said casing and within the dash, one of said valves adapted to engage the valve-seat of said casing, the oil and steam passages adjacent to the point of discharge both inclining outwardly, and the inner passage having a greater angle of inclination, whereby the two passages are made to approach each other.

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

WILLIAM L. FISHER.

Witnesses:

W. C. DURANT,
W. E. MARTIN.