

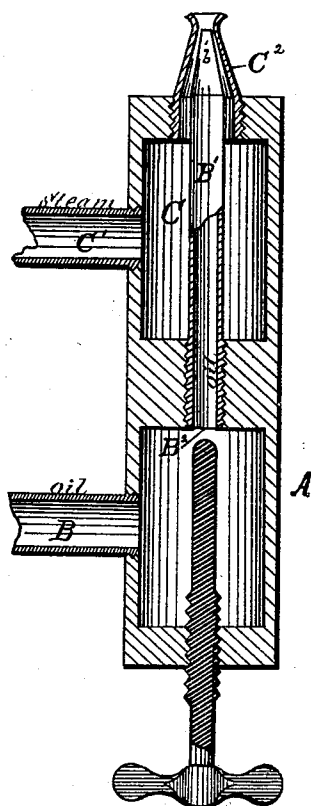
(No Model.)

S. H. DOUGLAS.

BURNER FOR LIQUID HYDROCARBONS.

No. 256,133.

Patented Apr. 11, 1882.



WITNESSES.

Samuel C. Thomas
J. Edward Warren

Silas H. Douglas INVENTOR.
By W. W. Leggett. ATTORNEY.

UNITED STATES PATENT OFFICE.

SILAS H. DOUGLAS, OF ANN ARBOR, MICHIGAN.

BURNER FOR LIQUID HYDROCARBONS.

SPECIFICATION forming part of Letters Patent No. 256,133, dated April 11, 1882.

Application filed November 26, 1881. (No model.)

To all whom it may concern:

Be it known that I, SILAS H. DOUGLAS, of Ann Arbor, county of Washtenaw, State of Michigan, have invented a new and useful Improvement in Burners for Liquid Hydrocarbons; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawing, which forms a part of this specification.

My invention consists of the combinations of devices and appliances hereinafter described, and more particularly pointed out in the claim.

In the drawing is represented, in longitudinal section, a burner embodying my invention.

It is the object of my invention to produce a burner for burning petroleum, tar, or other liquid hydrocarbon, not from the issuing jet itself, but at a point beyond the jet—as, for instance, in the combustion-chamber or flues of a boiler-furnace or other heater. This object has been accomplished heretofore by a burner in which the hydrocarbon is delivered through a central tube terminating in a reduced nozzle concentric with and surrounded by a steam-nozzle, so that a hollow jet of steam will surround the issuing jet of oil and vapor and carry it forward, the steam also coming in contact with an intermediate portion of the hydrocarbon-pipe, in order to heat and partially vaporize said hydrocarbon. I employ these features in my improvement, but have placed them in a novel and compact relation, whereby I produce a burner easily applicable to any kind of furnace, easily operated and regulated, cheap, durable, and reliable.

A represents a hydrocarbon-burner. B is the induction-conduit for the liquid. C is a steam-chamber, and C' a steam-induction conduit. C² is a steam-nozzle. B' is an oil-tube, terminating at its upper end preferably a little within and back of the end of the steam-nozzle, but concentric therewith. B² is a hand-valve for regulating the flow of liquid hydrocarbon to the nozzle. There may also be a stop-cock in the steam-inlet pipe C' for regulating the flow of the steam.

The operation of this device is substantially as follows: The burners are located—one or

more of them—in such position as to discharge into a furnace chamber, retort, fire-box, or flue, where the combustion is to be effected. The valve B² is opened more or less, so as to permit any desired flow of oil or liquid hydrocarbon through the oil-pipe B' and its reduced end b'. Steam admitted through C' into the chamber C surrounds the oil-pipe and partially heats its contents, and passes thence out through the steam-nozzle C². As the steam emerges it entirely surrounds the emerging jet of oil or hydrocarbon, and the result is that the two are very effectually commingled and the hydrocarbon so comminuted as to form, with the steam, a vaporous mass of almost homogeneous character, sufficiently oxygenized to support and maintain a perfect and rapid combustion.

By entirely inclosing the hydrocarbon-pipe in the steam-chamber, locating a hydrocarbon-chamber at its inner end, and providing said inner end with a valve the pipe may be well heated and the hydrocarbon in the chamber partially vaporized before any of it is allowed to enter the said pipe, and as the hydrocarbon in said chamber is always heated while the burner is being used, the valve B² may be so adjusted that a thin hollow stream of mixed liquid and vapor will flow into the pipe and be completely vaporized before it reaches the nozzle. In this condition it is very highly inflammable, and will be fit to supply to feeble fires.

It is evident that by a proper regulation of the valve at the bottom the amount of hydrocarbon fed onward can be so governed as to produce any desired amount of combustion within the combustion-chamber or furnace, retort, or fire-box, and by the valve in the steam-pipe a suitable amount of steam can be admitted to effect the proper object, and no more.

The extremity of the steam-nozzle may be plain; but I prefer to terminate it with a small outstanding flange, as it seems to have the effect of a more perfect dispersion of the mixture of oil and steam as they emerge from the jet. So, also, the oil-pipe may extend out even with the end of the steam-nozzle, or even beyond it, if desired; but I have found it preferable to project the steam-nozzle a little beyond the extremity of the oil-nozzle.

What I claim is—

A hydrocarbon-burner consisting of the casing having the steam and hydrocarbon chambers separated by a partition, the hydrocarbon-delivery pipe B', inclosed in the steam-chamber, opening through said partition and projecting through the opposite end of said steam-chamber, the steam-nozzle C², projecting from the steam-chamber and surrounding the end of said pipe, the valve B², arranged to close the inner end of said pipe, and the induction-con-

duits leading into the steam and hydrocarbon chambers respectively, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

SILAS H. DOUGLAS.

Witnesses:

W. A. DOUGLAS,
C. F. MEYER, Jr.