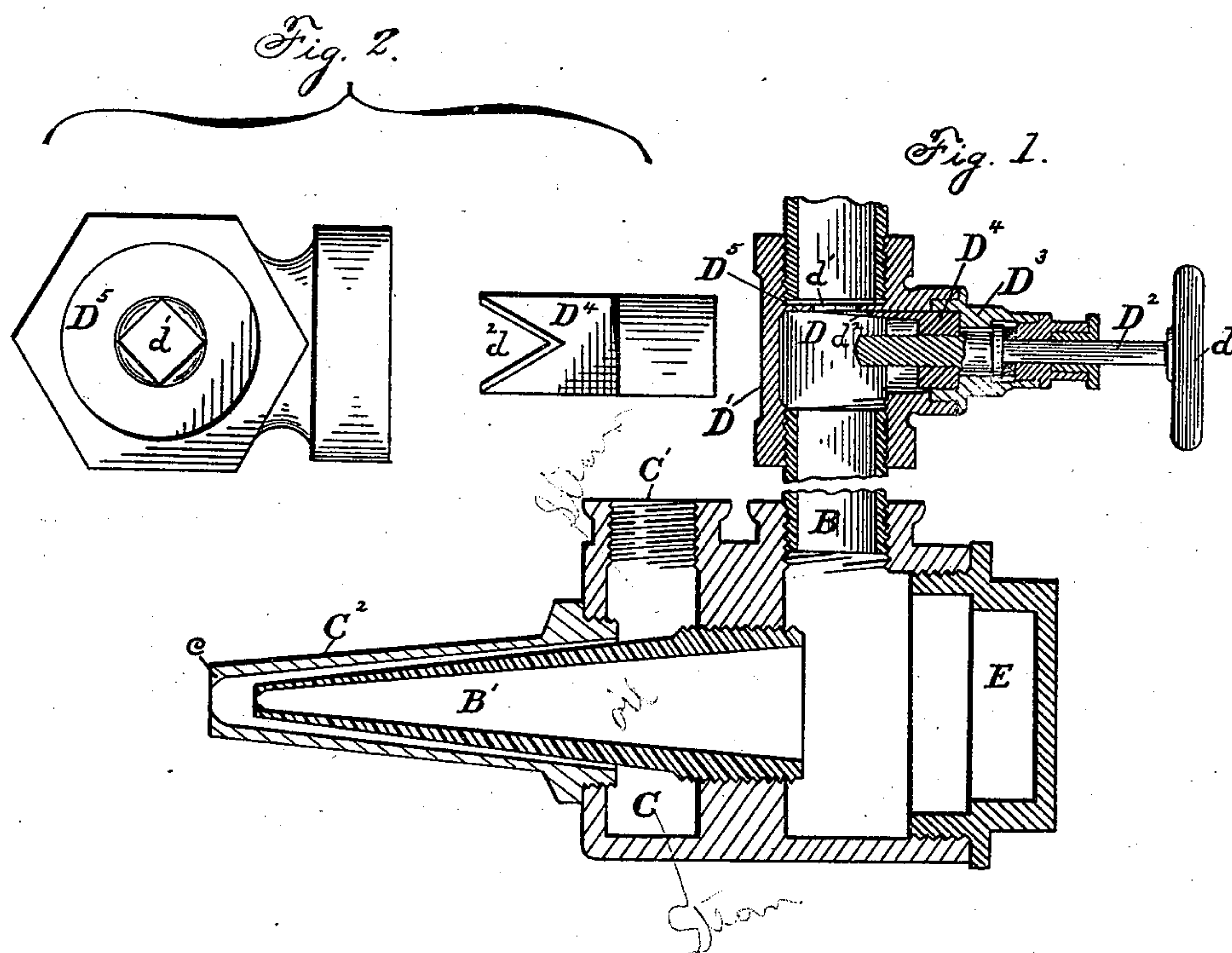


(No Model.)

S. H. DOUGLAS.
HYDROCARBON BURNER.

No. 272,863.

Patented Feb. 27, 1883.



Witnesses
Samuel C. Thomas.
J. Edward Warren

Inventor
Silas H. Douglas
By W. W. Leggett,
Attorney.

UNITED STATES PATENT OFFICE.

SILAS H. DOUGLAS, OF ANN ARBOR, MICHIGAN.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 272,863, dated February 27, 1883.

Application filed August 15, 1882. (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 Hydrocarbon-Burners; 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 drawings, which form a part of this specification.

This invention relates to improvements in the hydrocarbon-burner for which Letters Patent were issued to me April 11, 1882, No. 256,133; and my present invention consists in a regulating-valve arranged in the fluid-conduit, and provided with a valve-seat or diaphragm across the inlet-conduit, combined with a slide having a V-shaped notch adapted to be operated by a suitable valve-stem.

The invention also consists of other features, which will be fully hereinafter described in detail, and set forth in the claims.

The invention is fully illustrated in the accompanying drawings, in which Figure 1 is a longitudinal sectional view of a burner embodying my invention, and Fig. 2 a view of the valve and valve-seat.

Referring to the drawings, the letter A represents the hydrocarbon-burner.

B is the induction-conduit for the admission of the hydrocarbon liquid.

C is the steam-chamber; C', the steam-induction conduit.

C² is a steam-nozzle.

B' is the interior liquid-tube, having a screw-connection with the body of the burner at the base of the tube, whereby it is made adjustable in the steam-nozzle. In practice I find that it is necessary to make the outer surface of the hydrocarbon-nozzle B' nearly parallel with the inner surface of the steam-nozzle C², and that the two nozzles shall be so arranged with reference to each other that by the screw-connection the hydrocarbon-nozzle B' may be forced forward or withdrawn, so as to increase or diminish the steam-spaces between the two nozzles as well as secure a proper relation between the extremities of the two nozzles. I also find it important to make the extremity of the steam-nozzle with an instanding flange, c, at an angle of about forty-five degrees, so that the

steam proceeding in a direct line between the two nozzles shall strike the angular contraction in such manner as to be reflected and strike the steam or jet of hydrocarbon and project it into the fire-chamber completely broken up into spray.

B² is the spindle-valve for regulating the flow of liquid hydrocarbon to the nozzle.

As in my former patent, the steam-inlet pipe may be provided with a stop-cock for regulating the flow of steam. With the exception of the extremity of the steam-nozzle C², these several parts may be constructed as in my patent above cited, and the operation of this device is substantially the same, except that the improvement in the steam-nozzle herein mentioned gives more satisfactory results.

D represents my improved valve, located in the induction-conduit B, in which D' is the valve-connection.

D² is the valve-stem, provided with a suitable head, d, and screw cut on its inner end.

D³ is the casing of the valve-stem.

D⁴ is a straight-way valve or slide properly secured to the screw-cut end of the valve-stem.

D⁵ is a stationary diaphragm or valve-seat, located across the liquid-conduit. I construct said diaphragm with a square orifice, d', in the center, and the slide D⁴ with a V-shaped notch, d².

Heretofore a difficulty has been experienced in burning thick or heavy liquids from the fact that valves as ordinarily constructed are liable to get stopped up, the heavy liquids being likely to adhere to the valves; but by constructing the valve-seat with a square opening and by notching the valve, as above described, when the slide is moved to and fro upon the valve-seat a square opening is continually maintained, instead of a slot or crescent-shaped opening, as is more commonly the case.

I prefer to construct both the diaphragm and slide of as thin metal as is consistent with the necessary strength, so as to afford the least possible surface for the adhesion of the liquid. Moreover, to facilitate a free flow of the liquids and render them less likely to adhere to the edges of the V-shaped notch in the slide, the edges of the square orifice in the diaphragm are preferably cut or ground down to a thin knife-edge.

I am aware that oil and air tubes have been

employed in similar relation, but with the air-tube terminated in the form of a dome at the top and then a conical opening from the top of the dome; but in that case the air is not permitted to flow freely and unimpeded clear to the exit-point, but its course is impeded and its direction changed when it strikes the inner surface of the dome, and it has to change again and pass out around the obstructing salient angle between the conical discharge and the inner wall of the dome. In my device, however, the conical discharge-orifice is projected downward until the conical surface meets the inner cylindrical wall of the tube, so that the only angle formed is this re-entrant angle between these two surfaces, which only tends to converge and not to disperse or obstruct the particles of steam.

What I claim is—

1. In a hydrocarbon-burner, a regulating-valve located in the liquid-conduit, said valve provided with a valve-seat or diaphragm across the inlet-conduit constructed with an angular orifice, and a slide provided with a V-shaped notch, said slide adapted to be operated by means of a suitable valve-stem, substantially as described.

2. In a hydrocarbon-burner, a regulating-

valve located in the liquid-conduit, said valve provided with a valve-seat or diaphragm of thin metal across the liquid-conduit, said diaphragm constructed with an angular sharp-edged orifice, and a slide provided with a V-shaped notch, said slide constructed of thin metal and sharpened on the edges of the notch, the slide adapted to be operated by means of a suitable valve-stem, the construction being such that when the valve is open an angular orifice will be continually secured, substantially as described.

3. The combination, with a hydrocarbon-burner provided with a steam-nozzle constructed with an interiorly-contracted orifice, of a valve located in the liquid-conduit provided with a valve-seat constructed with an angular orifice, and a valve-slide constructed with an angular notch, and in connection therewith a suitable plug, E, substantially as described.

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

SILAS H. DOUGLAS.

Witnesses:

SAML. T. DOUGLAS,
J. EDWARD WARREN.