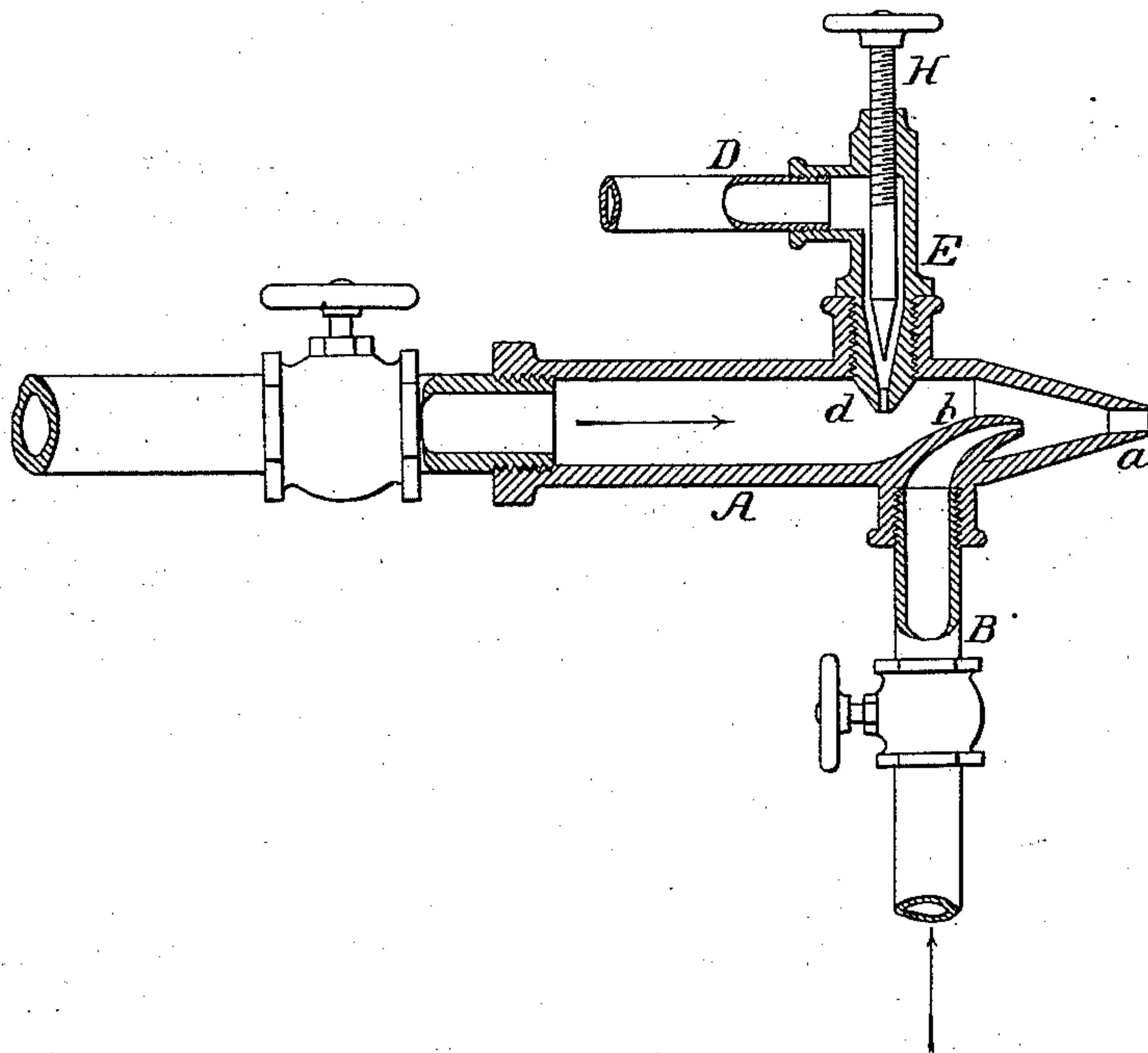


(No Model.)

J. K. CALDWELL.
HYDROCARBON BURNER.

No. 302,466.

Patented July 22, 1884.



WITNESSES:

David S. Williams
James F. Jobin

INVENTOR:

Joseph K. Caldwell
by his Attorneys
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UNITED STATES PATENT OFFICE.

JOSEPH KAY CALDWELL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR
OF ONE-HALF TO CHARLES S. GREENE, OF SAME PLACE.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 302,466, dated July 22, 1884.

Application filed October 4, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH K. CALDWELL, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Hydrocarbon-Burners, of which the following is a specification.

My invention consists of an improvement, fully described hereinafter, in that class of burners for consuming liquid hydrocarbon in which air and steam brought to bear on the liquid cause a gas or vapor, which, when ignited, produces a flame of large volume and great heat; and the object of my invention is to limit the supply of steam in burners of this class by causing air under pressure to perform the duty of spraying or atomizing the hydrocarbon in place of the steam which has been usually employed for this purpose.

The figure in the accompanying drawing represents my improved hydrocarbon-burner partly in section.

The main pipe A communicates with the force-pipe of any available air-compressor, or with a vessel containing a supply of air under pressure, the pipe, which is furnished with a suitable regulating-valve, terminating in a nozzle, *a*. A pipe, B, communicating with any neighboring steam-generator, and also furnished with a regulating-valve, is secured to the pipe A, and communicates with a nozzle, *b*, within the tube A, near the tapering end of the same, this nozzle being directed toward the orifice of the nozzle *a*. There is a third pipe, D, communicating with a reservoir containing hydrocarbon, and with the main pipe A through a chest, E, which is attached to the said pipe A, and terminates in a nozzle, *d*, there being in the interior of the chest a seat for the conical termination of the threaded spindle H, which screws into the chest, and by the manipulation of which the flow of hydrocarbon from the reservoir to the burner may be regulated.

In hydrocarbon-burners of the class to which my invention relates the general practice has been to rely upon a forcible jet of steam to spray or atomize the limited supply of hydrocarbon admitted to the burner, and the consequence of this has, in many cases, been that too much steam was required for this purpose, the excess of steam detracting from the vol-

ume, heat, and clearness of the flame; hence I use air under pressure to perform the desired duty of spraying or atomizing the hydrocarbon, and a supply of steam just sufficient to insure perfect combustion.

I am aware that burners have been constructed in which a jet of steam is caused to induce a flow of oil and air past the steam-nozzle; also, that oil has been vaporized by a jet of combined air and steam, and that a mixture of oil vapor and steam has been projected into an air-supplying pipe; but in all these cases the steam-jet is the active forcing and vaporizing element, so that it is difficult, if not impossible, to prevent the objectionable excess of steam above alluded to. Burners have also been devised in which air is blown through a pipe into the combustion-chamber, and oil mixed with said air by introducing it through a pipe projecting into the air-pipe and bent forward therein; but in these burners no steam is used, and there is thus a material difference between the same and my invention.

I therefore claim as my invention—

1. As an improvement in burning hydrocarbon fuel, the method herein described, said method consisting in first vaporizing the hydrocarbon by means of a current of air under pressure, then injecting steam into the mixture of hydrocarbon vapor and air, and finally discharging the mixture of steam, air, and hydrocarbon vapor into the combustion-chamber of the furnace, all substantially as set forth.

2. The combination, in a hydrocarbon-burner, of the following elements, namely: a pipe, A, communicating with a supply of air under pressure, and terminating in a nozzle, *a*, a pipe, D, communicating with a reservoir of hydrocarbon, and terminating in a nozzle, *d*, projecting into the pipe A, and a pipe, B, communicating with a steam-generator, and terminating in a nozzle, *b*, which projects into the pipe A in advance of the nozzle *d*, as set forth.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOSEPH KAY CALDWELL.

Witnesses:

JOHN E. PARKER,
HARRY SMITH.