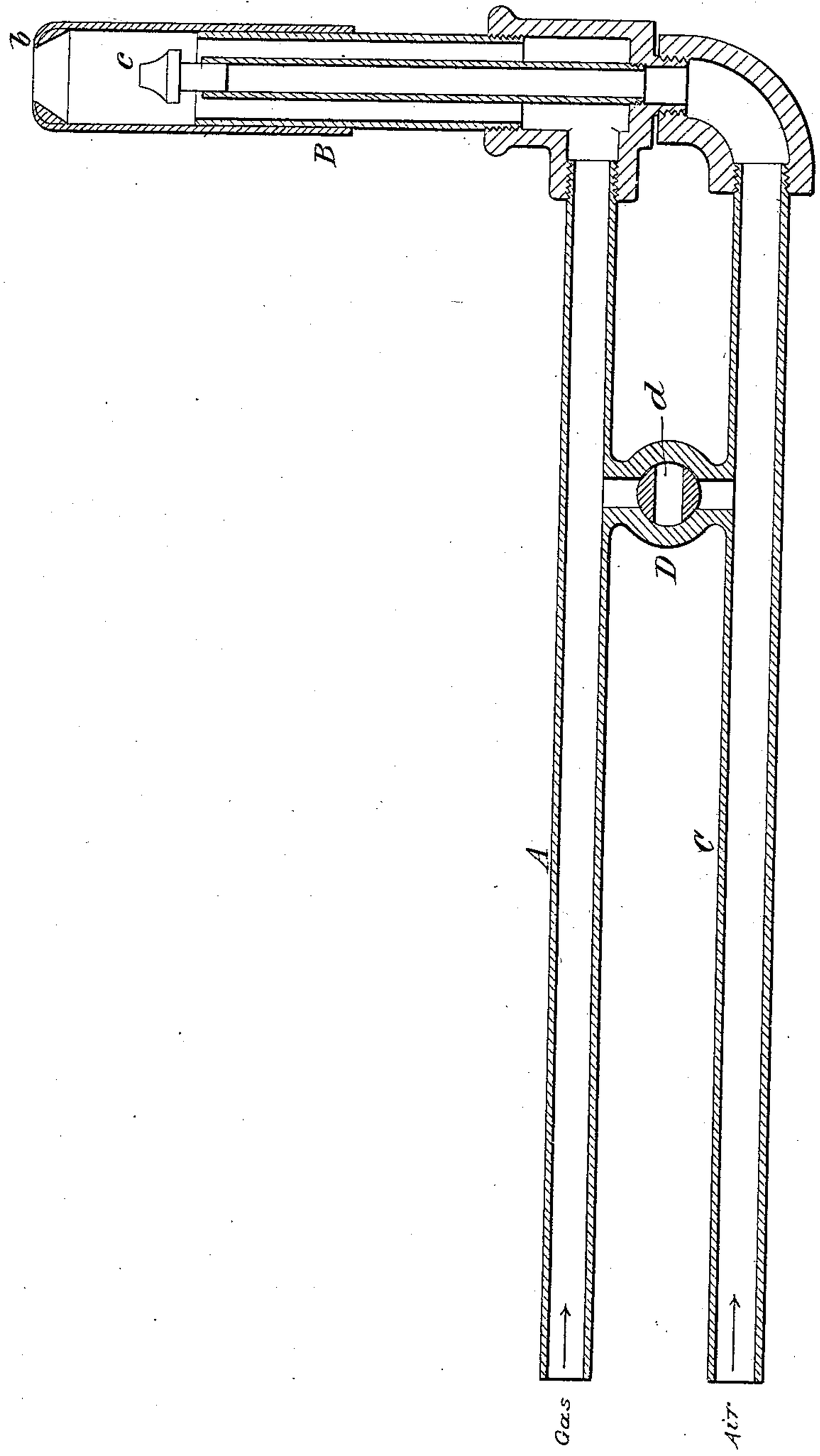
(No Model.)

J. F. BARKER.

GAS BURNER.

No. 552,345 Patented Dec. 31, 1895.



Witnesses:
Raphael Netter
Ernest Hopkinson

John F. Barker Inventor.
Clarkson A. Collins
by Atty

UNITED STATES PATENT OFFICE.

JOHN F. BARKER, OF SPRINGFIELD, MASSACHUSETTS.

GAS-BURNER.

SPECIFICATION forming part of Letters Patent No. 552,345, dated December 31, 1895.

Application filed August 5, 1895. Serial No. 558,321. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. BARKER, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Gas-Burners, of which the following is a specification.

My invention relates to that class of burners used in the industrial arts where a small, pointed heating-flame is required, as in brazing, soldering, glassworking, &c.; and the object of my improvements is to provide a burner of this class in which the so-called gasoline gas may be utilized for such purposes. It has not been practicable to use this gas with the burners heretofore employed and produce the hot, fine-pointed flame required, since owing to the great percentage of carbon contained in it it forms a flame which is so blunt-ended and so far cooled by the air-blast and by the surrounding atmosphere as to be undesirable, and which, moreover, is easily blown off the burner-tip by the air-blast. In order to obviate these difficulties I have constructed a burner in which the tip of the air-blast pipe, which is located within the gas-outlet pipe of the burner, is placed so far back from the orifice of the burner-tip that there is space for the gas to burn within the burner and around the tip of the air-pipe, but not so far as to permit the air-blast to become dissipated within the burner and follow the sides of the burner to the orifice instead of remaining central to the flame. The orifice at the tip of the burner is made so large that the gas-flame, when the gas is ignited on the outside of the burner, can pass back through the orifice and ignite the gas. In order that the rich hydrocarbon gas may be so diluted as to enable it to be lighted within the burner-tube, I provide an adjustable by-pass between the gas and air pipes leading to the burner, whereby any desired proportion of air may be mixed with the gas before it reaches the point of combustion and its quality thus reduced to the extent required.

The invention will be best understood by reference to the accompanying drawing, which shows a view in section of a burner made in accordance therewith.

Referring to the drawing, A indicates a gas-pipe leading to the retort gas-burner B.

C is an air-pipe which passes through the wall of the burner B and terminates in the tip *c*, located on the center line of and within the burner B, and provided with a small orifice, from which, when the burner is in operation, issues a needle-like jet of air. The tip *c* of the air-pipe C is placed at such a distance back from the orifice *b* of the burner B as to permit the gas to burn within the burner between the tip *c* and the orifice *b* and around the tip *c*. It must, however, not be withdrawn too far from the orifice *b*, as it would be if it were placed, for example, at the base of the burner, since in this case the air-jet would become, to some extent, dissipated and mixed with the gas before passing out of the orifice *b*, and the sharp-pointed flame desired could not be obtained. In practice I find a distance of about one inch between the orifice *b* and the tip *c* the most desirable.

If desired, the upper part of the burner B may be made to slide upon the lower part, so that the distance between the orifice *b* and the tip *c* may be properly adjusted as required. The sides of the burner B are made tight, so as to prevent the ingress of any atmospheric air, whereby the flame would be cooled, and the sides of the burner-orifice *b* are sloped inwardly, so that while there is sufficient space within the burner for the proper combustion of the gas the flame will be reduced in size as it passes out of the burners and the air-jet kept central with the flame.

The gas-pipe A and the air-pipe C are connected by a by-pass D, in which is a valve or cock *d*, by means of which any required proportion of air may be allowed to pass from the pipe C into the pipe A, the air being always under a somewhat higher pressure than the gas.

In using the burner, gas and air are turned on through the pipes A and C, and the gas is ignited at the orifice *b* of the burner B. While the gas retains its normal richness the

gas will burn at the orifice *b* as at the tip of an ordinary burner, and the air-jet from the tip *c* passing through it will produce only a blunt point on the flame. The flame also under these conditions is not sufficiently hot, being cooled by the atmosphere on all sides, as well as by the air-jet passing through it, and is easily blown off its seat by the air-jet. The by-pass D is then opened and a proportion of air from the pipe C is mixed with the gas in the pipe A. As the gas approaches the explosive point, the flame will catch within the burner B, and the gas burns within the burner between the orifice *b* and the tip *c* and around the tip *c*. The gas-flame being confined by the heated walls of the burner and out of contact with the atmosphere is kept hot and is not unduly cooled by the passage through it of the air-jet from the tip *c*, which supplies sufficient oxygen for perfect combustion and carries the flame forward through the orifice *b* to a long sharp point.

By means of my invention I enable a rich hydrocarbon gas to be used with hand-blast burners in those arts where a hot, fine-pointed flame is required, a result which has never before been accomplished and the importance of which will be readily apparent to those skilled in the art.

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

The combination with a hand blast gas burner having closed walls and provided with an orifice having inwardly inclined sides and sufficiently large to permit the ignition of gas within the burner therethrough, of a gas pipe leading to such burner, an air pipe terminating within said burner and having its tip so far withdrawn from said burner orifice as to permit the gas to burn within said burner between said orifice and said tip, a by-pass between said gas and air pipes and a valve in said by-pass, substantially as and for the purposes set forth.

In testimony whereof I have hereunto subscribed my name this 20th day of July, A. D. 1895.

JOHN F. BARKER.

Witnesses:
A. J. SCHAEFFLER,
C. B. ELMER.