

(No Model.)

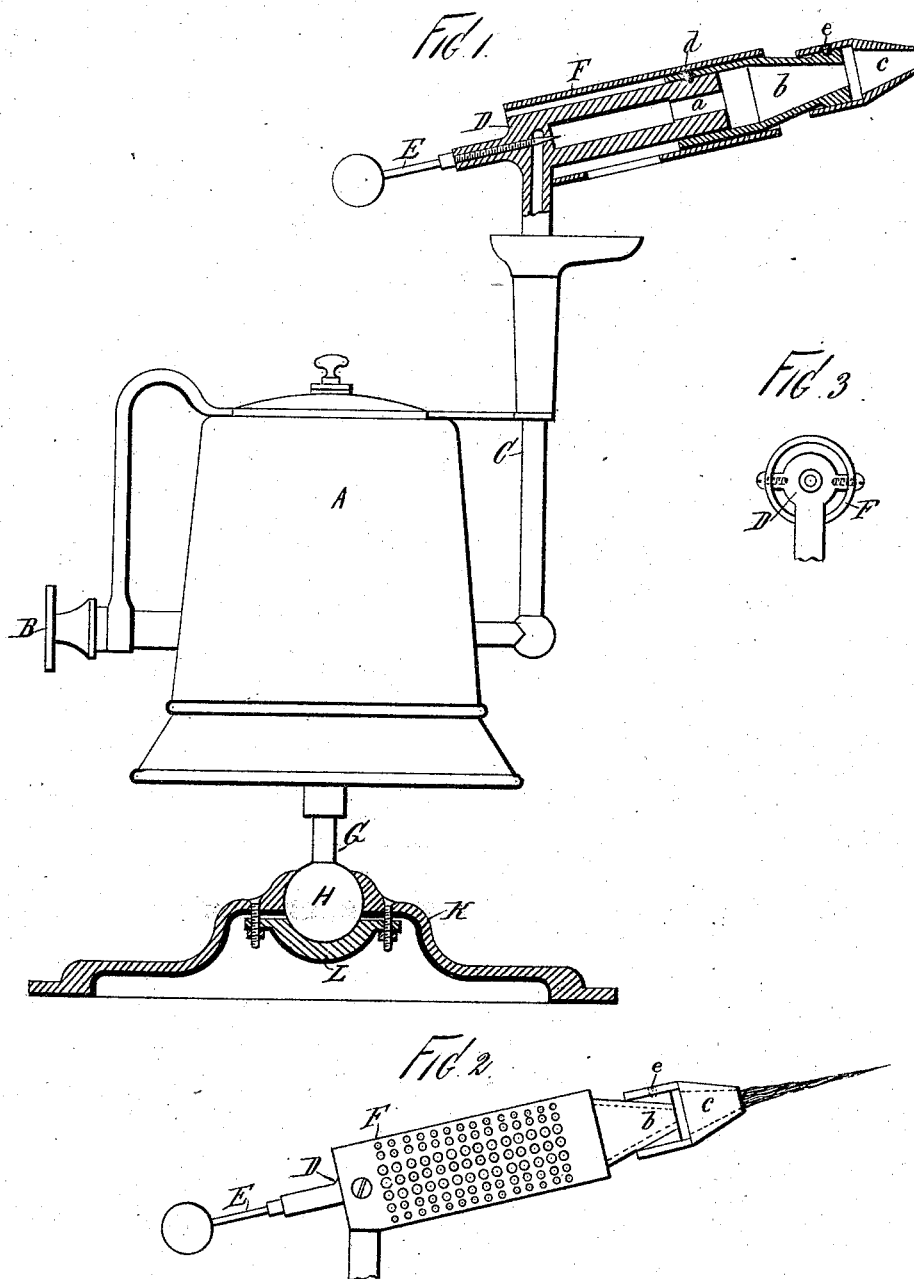
2 Sheets—Sheet 1.

T. P. DOANE.

METHOD OF AND MEANS FOR PRODUCING POINTED FLAMES.

No. 305,439.

Patented Sept. 23, 1884.



Witnesses:  
John Tucker,  
Henry Lieb,

Thomas P. Doane,  
Inventor:  
By North Osgood  
Attorney

(No Model.)

2 Sheets—Sheet 2.

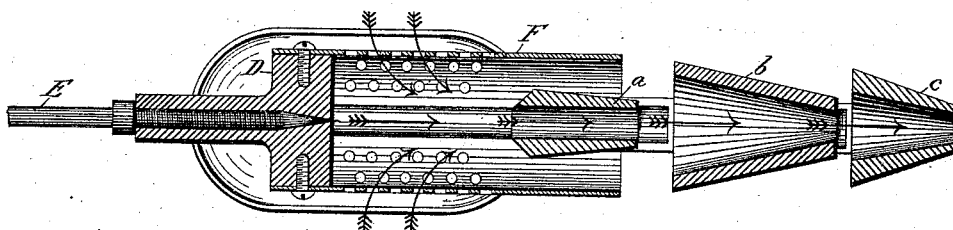
T. P. DOANE.

METHOD OF AND MEANS FOR PRODUCING POINTED FLAMES.

No. 305,439.

Patented Sept. 23, 1884.

FIG. 4.



Witnesses:  
John Buckler,  
Henry Sub,

Thomas P. Doane  
Inventor  
By Horth Ogden  
Attorney

# UNITED STATES PATENT OFFICE.

TRUMAN P. DOANE, OF BROOKLYN, NEW YORK.

## METHOD OF AND MEANS FOR PRODUCING POINTED FLAMES.

SPECIFICATION forming part of Letters Patent No. 305,439, dated September 23, 1884.

Application filed November 5, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, TRUMAN P. DOANE, of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Methods of and Means for Producing Pointed Flames, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings and to the letters of reference marked thereon.

My invention has relation to that class of devices employed for producing a pointed flame, like unto the blow-pipe flame, for brazing, assaying, and other purposes requiring a high degree of heat.

The object of my invention is, primarily, to produce the pointed flame without the use of the separate blow-pipe, as heretofore ordinarily employed, and a secondary object is the production of a simple, cheap, and efficient burner, by which the pointed flame may be produced. To accomplish all of this my improvements involve a novel and useful method of producing the pointed flame, and certain novel and useful arrangements or combinations of parts of the apparatus and principles of operation, all of which will be herein first fully described, and then pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a partial section and elevation of a vapor-burning torch arranged for operation in accordance with my invention and involving the principles thereof. Fig. 2 is a side elevation of the burner shown in Fig. 1, the same being detached from the other parts; and Fig. 3 is an end elevation of the same. Fig. 4 is an axial section of the burner, the arrows representing the directions taken by the currents of air and gas when the burner is in operation.

In all these figures like letters of reference, wherever they occur, indicate corresponding parts.

Heretofore the blow-pipe flame has been produced by injecting a current of air into the flame, using a blow-pipe, which must be operated independently of the burner, (either by the lungs of the operator or by some separate blowing or blast-producing apparatus.) According to my invention I feed the gas or material for producing the flame under pressure of such

degree that it will carry with it a current of air sufficient to insure the required combustion, and then I reduce the burning gas and air to a pointed flame, thus making the gas, as it were, do its own blowing, and obviating all necessity for the separate blow-pipe or separate blowing apparatus. The gas may be put under pressure by various means. The apparatus shown in the drawings is one means which may be employed, and will serve as an example.

A is the reservoir of a vapor-burning torch calculated to be supplied with any easily-vaporizing material—such as naphtha, &c.—the same being fed to the burner under pressure, in this case produced by pumping air into the reservoir over the material by any air-pump, as at B.

C is the pipe leading from the reservoir to the burner above, and conducting oil or liquid thereto to supply the flame.

D is the main body of the burner, having a needle-screw, as E, for regulating the flow of gas. Like other vapor-burners, this burner is kept highly heated, (while in operation,) and the heat vaporizes the liquid fed to the burner, the vapor issuing from the jet-orifice under considerable pressure, as is well understood. In the path of the gas-current I place a director, *a*, by which the gas and air mingled therewith is somewhat reduced, so that instead of spreading out into a wide sheet of flame it will be narrowed down. In advance of the director *a*, I place another director, *b*, at such distance that it will receive the current of air and gas from *a*, together with whatever addition of air may be inducted by the rapid current after leaving *a*. The perforations through *a* and *b* may be cylindrical or cone shaped, but are preferably made so as best to reduce the size of the flame. With these two directors the burner will operate to very good advantage; but in case a finer or better pointed flame be required I add a third director in advance of *b*, as shown at *c*, the same being arranged to receive the current from *b*, together with whatever volume of air may be added thereto, as the current passes rapidly from *b* to *c*. The current of gas under pressure induces the inflow of air upon principles well understood, and from the above it will be seen that the gas is thus made to draw in with

it all the air that may be required, dispensing with the separate blow-pipe, as contemplated by my invention.

The directors *b* and *c* may be made adjustable back and forth, as by the set-screws *d* and *e*, so as to regulate the size of the flame according to the pressure upon the issuing gas or according to other circumstances. The spaces between the directors are found to operate advantageously in affording overflow-passages, so that in the event of too great a flow of gas and air the surplus can escape without materially altering the size or length of the pointed flame. As will be readily understood, the directors may be made in a great variety of shapes, and may be increased in number to any extent desired, so long as the result is the production of the pointed flame.

To insure a steady flame or prevent interference with the current of gas and air, I surround the burner with a perforated shield or guard, *F*, the same being made sufficiently open to afford a free inflow of air, ample for mingling with the gas. This guard also prevents odor arising from burning naphtha. I find it advantageous to leave an air-opening around the burner, and between it and the shield *F*, as shown in Fig. 3, though this may not be necessary in the majority of cases. The pressure of gas may be produced in any way. The vapor-burning torch is a simple, cheap, and handy means of producing the pressure, but it is not necessary that the material therein be induced to flow to the burner by air-pressure, as in the example represented in the drawings. The reservoir might be elevated above the burner, and the liquid be fed by gravity, the pressure produced depending upon the height of the reservoir above the burner.

When my improved burner is applied upon a portable apparatus, such as shown in the drawings, it will be found advantageous to mount it upon a base, so that the burner may be directed toward any point. The reservoir is shown as mounted upon a stem, *G*, of a ball, *H*, secured in a base-plate, *K*. This makes a ball-and-socket joint, upon which the apparatus may be turned and held in any position required.

*L* is a clamping-plate by which the ball may be tightened as may be required to compensate for any wear.

The burner constructed and arranged for

operation upon the principles above set forth has been found in practice to afford an excellent pointed flame, with a high degree of heat and marked steadiness and uniformity superior to any of the ordinary blow-pipe arrangements.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent is—

1. The herein-described method of producing a pointed flame, which consists in feeding the gas to the burner under pressure sufficient to induct the requisite amount of air, and then gradually reducing the size of the current of combined air and gas, so that as it finally issues from the burner it will produce the pointed flame, for the purposes and objects named.

2. In a burner, a series of directors for concentrating and gradually reducing the current of combined air and gas, as explained, so that as it finally issues from the burner it will produce the pointed flame, said directors being located in the path of the issuing gas and combined with the burner, substantially as and for the purposes set forth.

3. A series of air and gas directors located in the path of the issuing gas from the burner, and arranged to gradually reduce the size of the current of combined air and gas, said series being arranged with air-openings or overflow-passages, substantially as and for the purposes set forth.

4. In a burner provided with a series of air and gas directors arranged to produce a pointed flame, as explained, by gradual reduction of the current of combined air and gas, the combination, with the burner, of a perforated shield or guard, substantially as and for the purposes set forth.

5. In combination with an apparatus adapted to supply liquid fuel to the burner under pressure, a vapor-burner provided with air and gas directors, arranged to reduce the current of combined air and gas, so as to produce the pointed flame, substantially as and for the purposes set forth.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of two witnesses.

TRUMAN P. DOANE.

Witnesses:

OTTO VON ELLER,  
WORTH OSGOOD.