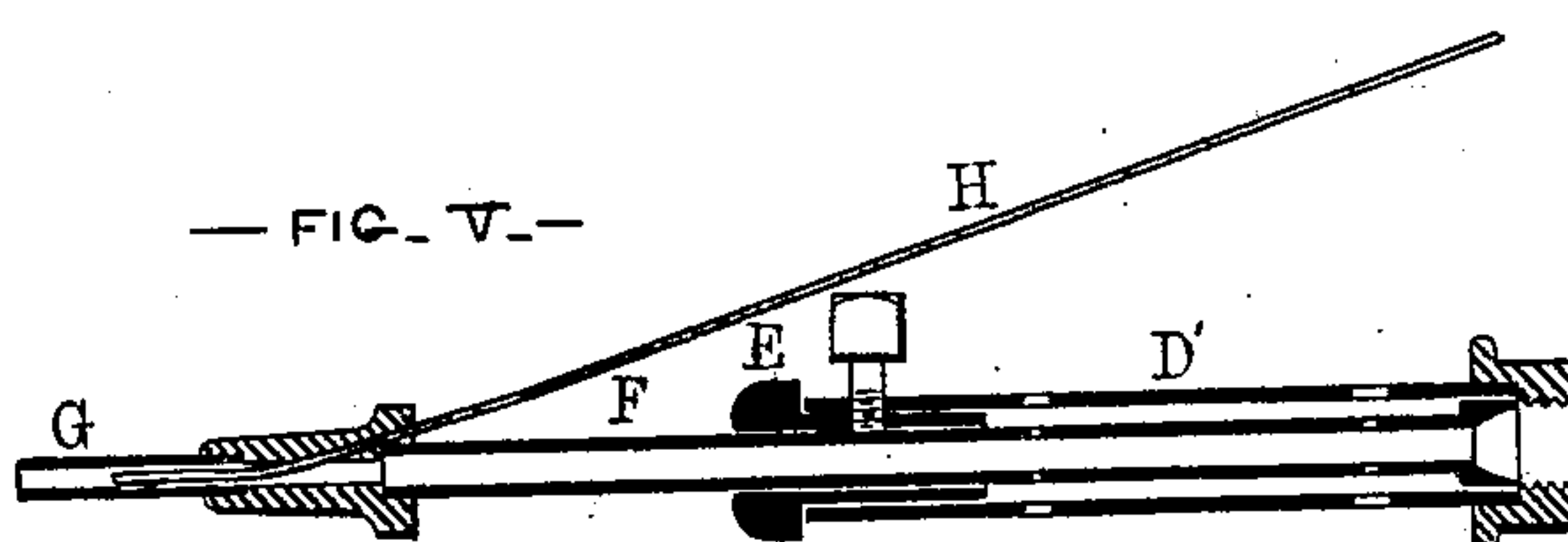
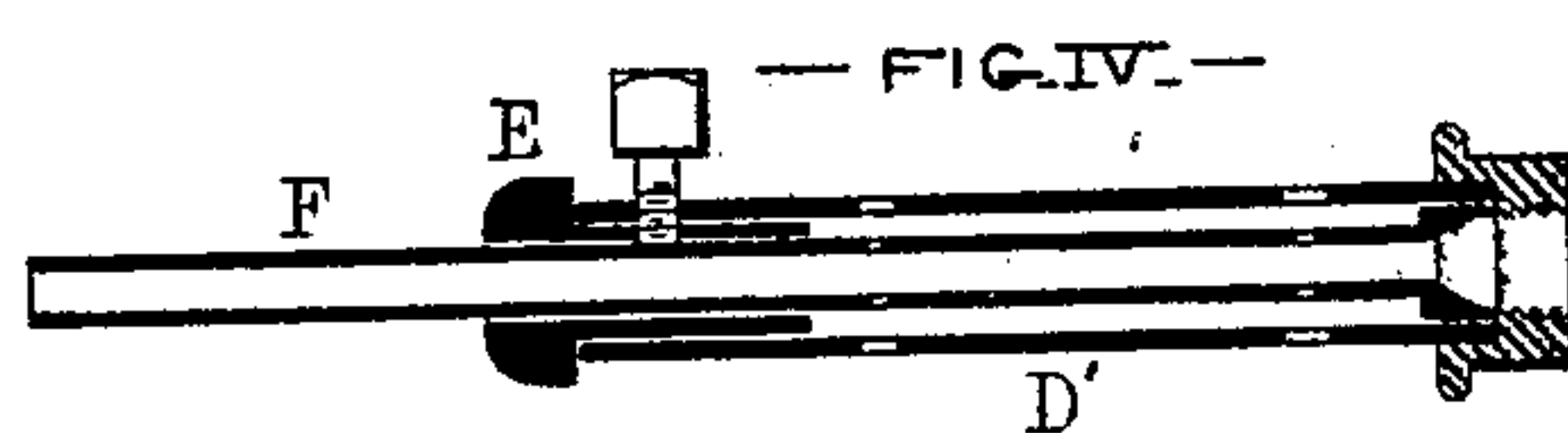
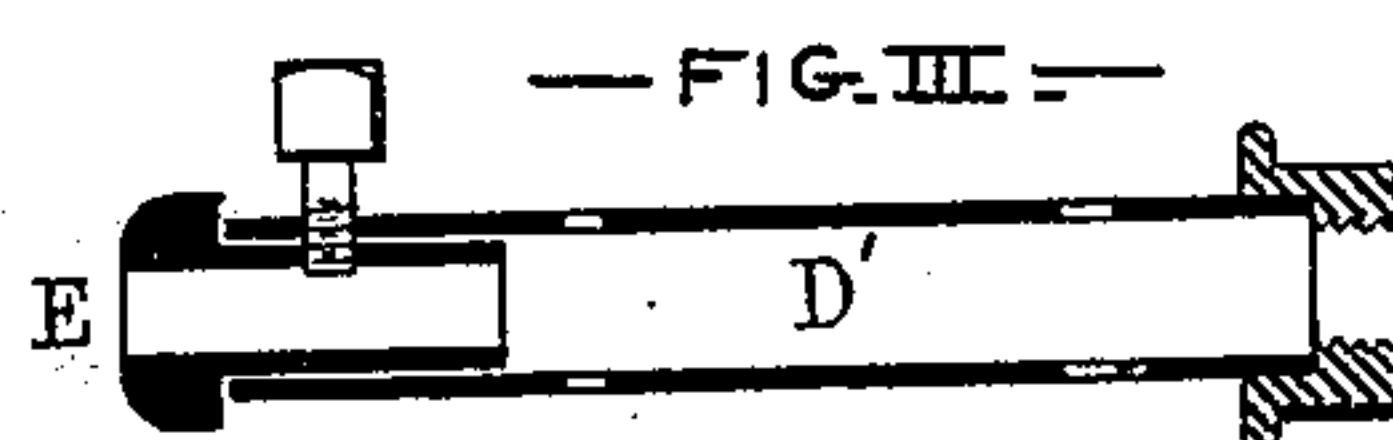
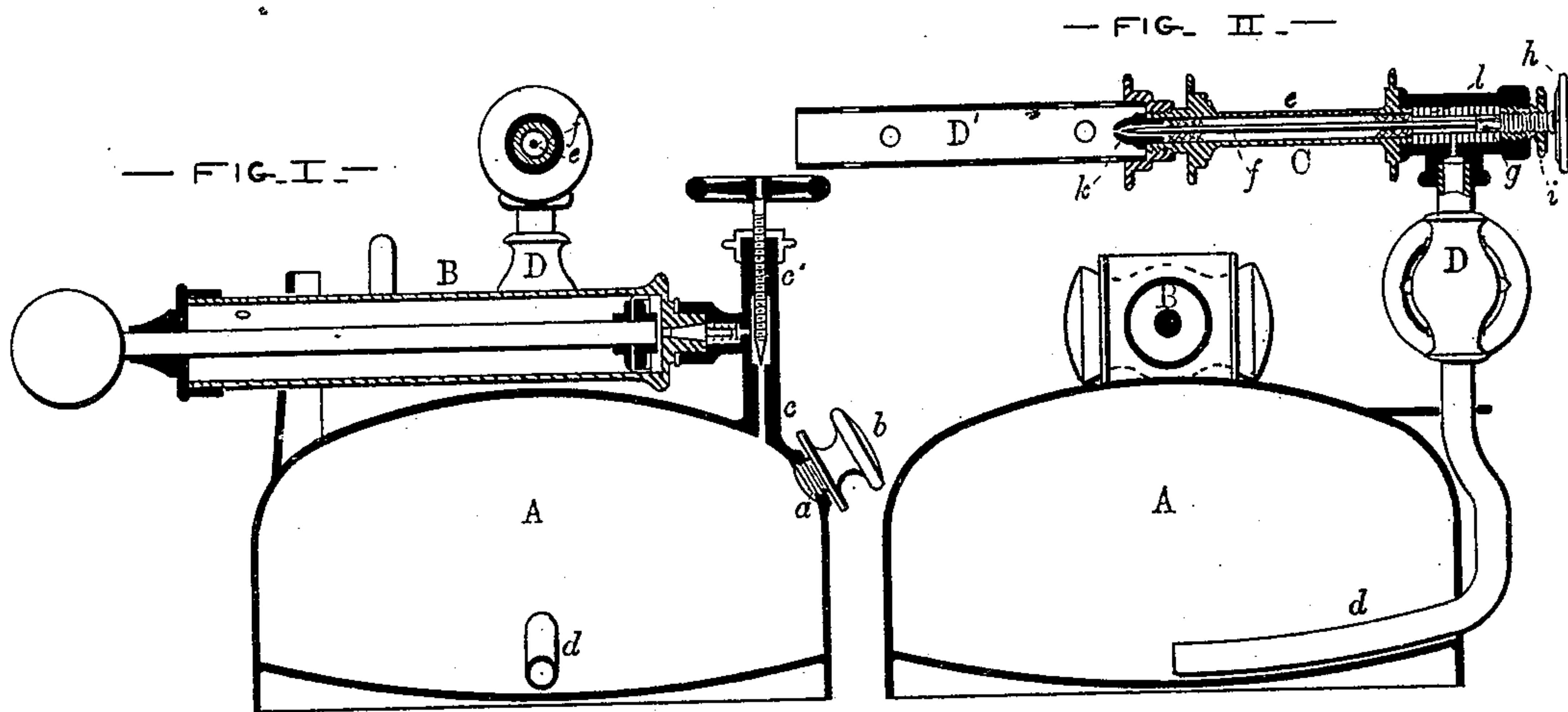


## Blow-Pipes.

No. 205,747.

**Patented July 9, 1878.**



-WITNESSES- -

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# UNITED STATES PATENT OFFICE.

JOHN S. HULL, OF CINCINNATI, OHIO.

## IMPROVEMENT IN BLOW-PIPES.

Specification forming part of Letters Patent No. **205,747**, dated July 9, 1878; application filed December 13, 1877.

*To all whom it may concern:*

Be it known that I, JOHN S. HULL, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain Improvements in Blow-Pipes, of which the following is a specification; and I do hereby declare that in the same is contained a full, clear, and exact description of my said invention, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention relates to an improved complete portable blow-pipe to be used for soldering, brazing, burning hard paint from wood-work, and for a variety of other purposes too numerous to mention, wherein the flame is produced by the rapid combustion of a jet of vaporized hydrocarbon or other combustible fluid forced from a reservoir to a suitably-constructed burner by the expansive action on the surface of the said fluid of a body of atmospheric air confined within the said reservoir at a high pressure or tension.

The invention consists, first, in combining, in a single portable apparatus, a reservoir for the combustible fluid; an air-pump or air-compressing device, connected to the said reservoir by means of a pipe; a suitable burner, having a pipe connecting it with the interior of the reservoir aforesaid, and provided with a regulating-valve; and a combustion-tube, surrounding the nozzle of the burner, as hereinafter fully described.

The said invention consists, secondly, in means for contracting and elongating the combustion-chamber, or that part of the apparatus wherein the vapor from the combustible fluid is first brought into contact with atmospheric air, and from which the flame issues, the devices employed being such as to admit of the graduated reduction of the diameter of the flame as may be required to suit the character of the work to be done.

The invention consists, thirdly, in combining, with one of the reducing devices hereinbefore alluded to, an air-tube or blast-pipe, whereby atmospheric air, or a mixture of air and inflammable vapor at a pressure above that of the atmosphere, is introduced centrally of the flame and within one of the said reducers, for the purpose of further intensifying the heat of the flame.

The invention consists, lastly, in a novel method of packing the aforesaid burner, whereby leakage of air, fluid, or vapor is prevented, as will hereinafter fully appear.

In the drawings forming a part of this specification, Figures 1 and 2 are vertical sections of the apparatus, showing the same without the reducing devices being attached thereto. Figs. 3, 4, and 5 are sectional views of the combustion-chamber on an enlarged scale, illustrating the manner of applying the reducers thereto, the last figure also showing the attachment of the blast-pipe, before referred to.

Similar letters of reference indicate similar parts in all the views.

A is the fluid-reservoir, provided with a filling-aperture, *a*, and a screw-cap, *b*, closely covering the same. B is an air-pump, consisting of a hand-operated device, whereby air from the exterior of the apparatus is compressed within the reservoir and above the fluid contained therein.

The means of communication between the pump and reservoir is an air-delivery pipe, *c*, which pipe is supplied with a suitable stop valve or cock, *c'*, to open or close communication between the said pump and reservoir, as may be required. The fluid-discharge pipe *d* connects the lower part of the reservoir with the burner C, and is provided with a stop valve or cock, D.

The burner C consists of a tube, *e*, through which extends longitudinally a wire, *f*, one end of which is inserted in or otherwise attached to a screw, *g*, having a suitable handle, *h*, and the other end sharpened or pointed. The screw *g* rests within a threaded packing-gland, *i*, which is screwed into an extension of the tube *e*, which is enlarged in diameter to form a packing box or chamber. The other end of the tube *e* of the burner is fitted with a nozzle, *k*, having a small conical central aperture, into which the pointed end of the wire *f* is forced by the turning of the handle *h* in one direction.

The turning of the handle, and with it the wire, in a reverse direction causes the pointed end of the wire to be withdrawn from the conical aperture, thereby giving to the said aperture its full discharging capacity.



By means of the wire *f* and its propelling devices the discharging-aperture in the nozzle *k* may be adjusted to any desired area, equal to or less than the full opening.

D' is the combustion tube or chamber, wherein the jet of vapor from the burner meets and is mixed with atmospheric air; and it consists of a perforated tube, screwed or otherwise fastened to the outer or forward end of the burner. The tube D' also serves to communicate heat to the burner, whereby the fluid passing through it is vaporized, as hereinafter described.

The packing used in the packing-box at the rear end of the burner, to prevent leakage therefrom, consists of rings of cork *l*, which are compressed by means of the screw-gland *i* within the packing-box.

Parts of the apparatus not yet alluded to will be described and their uses fully set forth in the description of the operation of the blow-pipe which follows: The reservoir is first supplied with, preferably, one of the light hydrocarbons to about one-half its capacity, the valve *c'* in the air-delivery pipe *c* and the valve formed in the burner by the pointed wire being closed. Air is then forced by means of the pump to the reservoir until the required pressure or tension of air is obtained, after which the valve D is closed. The apparatus is now ready for use. Upon slightly unscrewing the pointed wire by means of the handle *h*, fluid is projected from the burner in form of a jet, which jet is ignited and continues to burn, giving out little heat, until the combustion tube or chamber D', together with the burner, is sufficiently heated to cause the vaporizing of the fluid passing to the nozzle *k*.

A more expeditious method of heating the combustion-tube and burner until the vaporization of the fluid in the burner is commenced, and one generally practiced by the operator, is the application of a lamp-flame to the exterior of the expansion-chamber and burner. When the apparatus is fully in operation, the generation of the vapor in the burner is automatically accomplished by the heat from the flame alone. Air to support the combustion of the vapor is admitted to the combustion-chamber through perforations in the rear end thereof, the perforations in the forward end being merely to allow the escape of a small portion of the flame to the exterior of the combustion-tube, to assist in heating the same and the burner.

The central portion of the burner, around the wire *f*, is packed with lamp-wick or other suitable material, and the ends thereof with wire-gauze, to assist in the generation of the vapor by retarding the passage of the fluid through the burner to the nozzle.

In Fig. 3 the outer end of the combustion tube or chamber D' is shown contracted by the insertion therein of the first of a series of reducers, E. In Fig. 4 the said tube is illustrated as further contracted by a second reducer, F; and in Fig. 5 a third reducer, G, is shown applied to the tube.

The heat of the flame is still further intensified by combining with one of the reducers a blast-pipe, H, leading from the upper portion of the reservoir containing compressed air, or from any other body of air at a high tension. In Fig. 5 the said blast-pipe is shown applied to the reducer G.

Having thus described my invention, what I claim as new, and wish to secure by Letters Patent of the United States, is—

1. The fluid-reservoir A, air-pump B, and burner C, having the nozzle *k* and pin *f*, entering and operating within the same, combined with the combustion-tube D', surrounding the said nozzle, substantially as and for the purposes specified.

2. In combination with the combustion tube or chamber D', a series of reducing devices adapted for insertion to the said tube or chamber, substantially as shown and specified.

3. In combination with a device for reducing the diameter of the combustion tube or chamber by being inserted therein, a blast-pipe, one end of which is introduced to the interior of the said reducing device, substantially as herein shown and described.

4. In combination with the packing-chamber, formed by enlarging an extension of the tube *c* of the burner and the pointed wire *f*, a series of cork rings surrounding the said wire, adapted, when compressed by the packing-gland *i*, to form a close joint, and thereby prevent the leakage of vapor or fluid from the packed end of the burner, substantially as herein set forth.

In testimony whereof I have hereunto subscribed my name this 3d day of December, A. D. 1877.

JOHN S. HULL.

Witnesses:

THOMAS MURDOCH,  
W. W. WHARTON.

1750 made.