

H. Baldwin.
 Burning Crude Petroleum.
 N^o 75238 Patented Mar. 10, 1868.

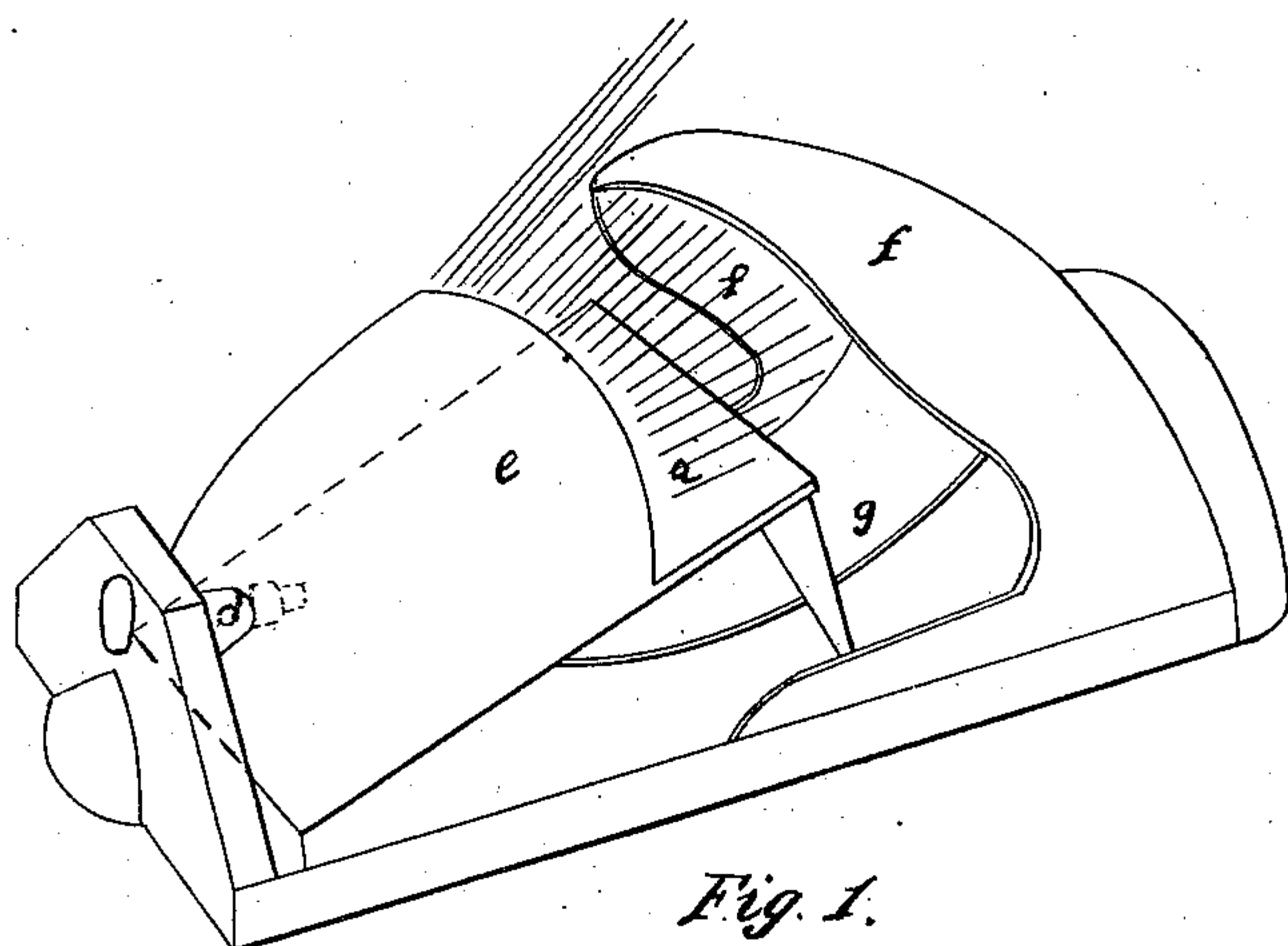


Fig. 1.

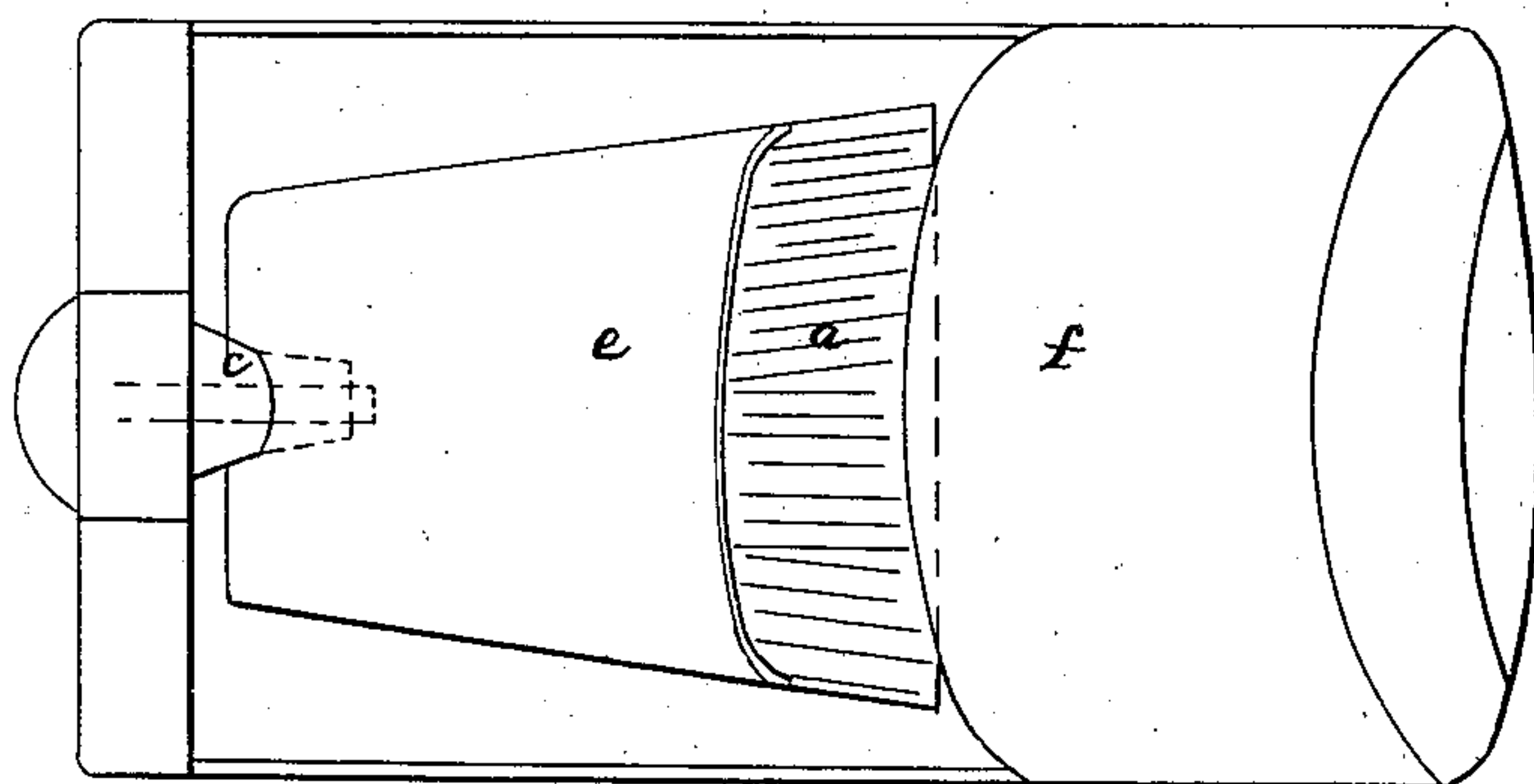


Fig. 2.

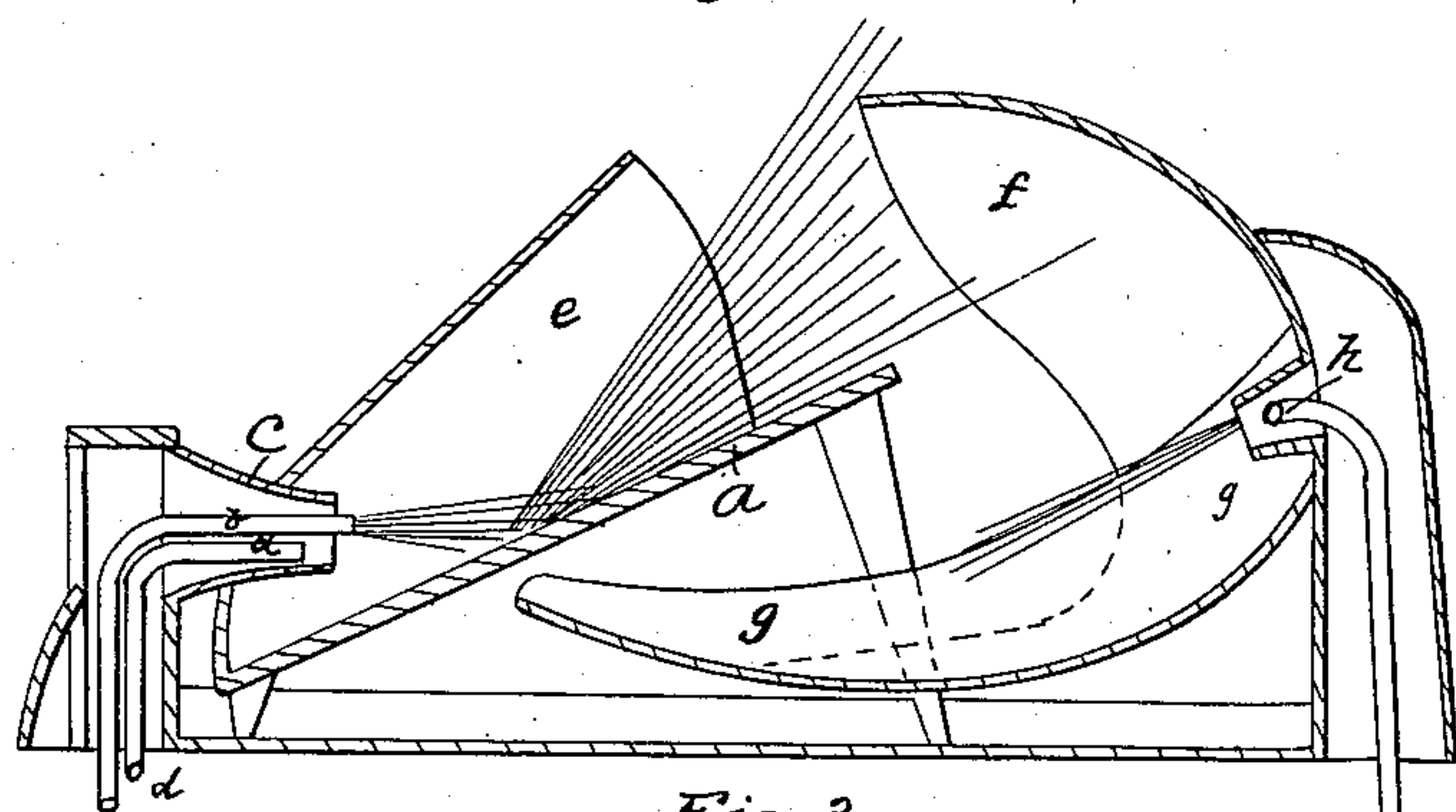


Fig. 3.

Witnesses.
 Andrew B. Howland.
 Justin C. Ware.

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HENRY BALDWIN, OF TITUSVILLE, PENNSYLVANIA.

Letters Patent No. 75,238, dated March 10, 1868.

APPARATUS FOR BURNING CRUDE PETROLEUM.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, HENRY BALDWIN, of the city of Titusville, county of Crawford, and State of Pennsylvania, have invented a new and improved Apparatus for Burning Crude Petroleum and other Fluid Hydrocarbons as Fuel; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification, and in which similar letters represent similar parts in all the views.

Many attempts have been made during the past ten or twelve months to obtain a perfect combustion of crude petroleum and its products, as a substitute for coal and wood, by first vaporizing the fluid, either in a close heated vessel or pipe, or by impinging it upon a piece of heated metal, usually termed a "heater," placed within the fire-box for that purpose, at the same time supplying the required amount of oxygen to assist in combustion. So far as my observation has extended, no one has succeeded in so arranging the apparatus that a sufficient degree of permanent heat can be imparted to the heater to perfectly vaporize the hydrocarbon; consequently from twenty-five to seventy-five per cent. of the fuel is wasted. The same difficulties exist, to a greater or less extent, in cases where the oil is vaporized in a close heated vessel or pipe.

When the petroleum is burned in an ordinary coal-fire box, as in the case of a portable boiler, the usual and simplest method is to place a piece of cast metal upon the grates, at any convenient point within the fire-box, upon which the fuel is impinged, accompanied by a jet of steam or air. Although the general principle of this method is correct, it has not been reduced to such practical form as to obtain satisfactory results, for the reasons above stated.

The principal object of my invention is to provide such an apparatus that when the fuel is vaporized by contact with a heated surface or "heater," of any form, and oxygen properly supplied, the flame and heat arising therefrom may be carried around under the heater and directed against a point on the reverse side of the heater, opposite the point upon which the fuel is impinged, while at the same time the intensity of the heat thus imparted to the heater can be varied at pleasure without detracting from the amount of heat available for other purposes. In the accompanying drawings—

Figure 1 represents a perspective view of my apparatus.

Figure 2 is a top view or plan; and

Figure 3, a vertical section on line A B.

For the purpose of convenient illustration, I have represented a portable apparatus, which can be set upon the grates of any ordinary fire-box.

a represents the piece of metal usually termed a "heater," upon which the jet of hydrocarbon is impinged; *b* is the hydrocarbon or fuel-supply pipe, passing through and having its discharge-orifice concentric with and just outside of the end of the oxygen-blast pipe *c*. *d* is a steam-pipe, having its discharge-orifice within the oxygen-pipe *c* and underneath the fuel-pipe *b*. The liquid fuel is injected through the pipe *b*, and oxygen, either in the form of steam or air, or both, is forced through the oxygen-blast pipe *c*, and united with the vapors of the fuel when in their nascent state. The discharge-orifice of the oxygen-pipe being around and concentric with the fuel-pipe, distributes the oxygen more perfectly, and the discharge-orifice of the fuel-pipe is carried outside of the oxygen-pipe, so that no drippings shall in any event fall into the latter. The steam-pipe *d* serves two purposes: By injecting a small quantity of steam a partial vacuum is formed within the oxygen-pipe, thus creating an artificial draught, while, by placing it underneath the fuel-pipe, the jet of steam will strike and carry forward any drippings from the orifice of the latter.

I have only represented one set of pipes, but they can be duplicated to impinge any desired number of fuel-jets upon the heater.

In order to prevent the counter and conflicting draughts usually caused by the flame confined within the fire-box from interfering with the proper combination of the hydrocarbon vapors with the oxygen previous to their complete ignition, I surround the orifices of these pipes, and also a portion of the heater *a*, with the jacket *e*, which may be attached to the heater or to any convenient part of the apparatus, thus forming a partial chamber, within which the process of oxygenation is completed previous to ignition.

Having thus arranged for the introduction and oxygenation of the hydrocarbon, it becomes necessary to provide some means for imparting the necessary degree of permanent heat to the heater *a*, and for keeping up the requisite heat under all circumstances, so as to completely resolve the fluid immediately upon contact. In order to do this without detracting materially from the heat made available for other purposes, I provide a reflector, *f*, made of such form, and placed in such a position with relation to the surface of the heater, that a portion of the flame and heat is deflected by the concave surface of the reflector *f*, and carried around and under the heater. In most cases I also provide a supplementary reflector or trough, *g*, which may be made adjustable or flexible, so that the greatest heat may be concentrated upon any point on the reverse side of the heater opposite to the point upon which the fuel is impinged. I also insert a small oxygen blow-pipe, *h*, through the rear portion of the reflector *f*, so arranged with relation to the reflectors *f* and *g* that a stream of air or steam, superheated, if desirable, may be introduced, and a hot blast directed upon any desired point of the heater. By these arrangements I can fully counteract the cooling influence of the fresh supplies of fuel and oxygen impinged upon the upper surface of the heater, and obtain the desired result, viz. the constant and complete vaporization of the hydrocarbon immediately upon contact with the heater. These reflectors in a portable apparatus should be made of metal, but in many cases they may be made of fire-bricks or clay, or other similar material. They are of the greatest importance in effecting the complete resolution of the fuel, and are equally applicable to cases where a close heated vessel or pipe is used in place of the heater illustrated. The reflectors *f* and *g* may be made together or in one piece of metal, but I prefer, for convenience, to make them separate, and adjustable with relation to each other and to the heater. They may be made of any suitable form to reflect the flame and heat around and against the heated surface, to accomplish the purposes substantially as above set forth.

I do not claim to have invented the broad principle or method of resolving and consuming fluid hydrocarbons by impinging jets of the same upon a heated surface, as that arrangement is but the application of a simple and well-known chemical principle, and has been in use in many localities for a long time, and is the property of the public; neither do I claim broadly the manner of injecting the fluid hydrocarbon and oxygen by two concentric pipes; but

What I claim as my specific invention, and desire to secure by Letters Patent, is—

1. I claim the jacket *e*, as arranged to surround the supply-pipes and a portion of the heater, and used in combination with the same, substantially as and for the purposes set forth.
2. I claim the reflector *f*, as arranged with relation to the heater, when used in conjunction with the same, substantially as and for the purposes set forth.
3. I claim the supplementary reflector *g* and blow-pipe *h*, as arranged with relation to the reflector *f* and heater *a*, substantially as and for the purposes set forth.

Dated at Titusville, Pennsylvania, this second day of July, A. D. 1867.

HENRY BALDWIN.

Witnesses:

ANDREW B. HOWLAND,
JOSEPH J. HOLDEN.