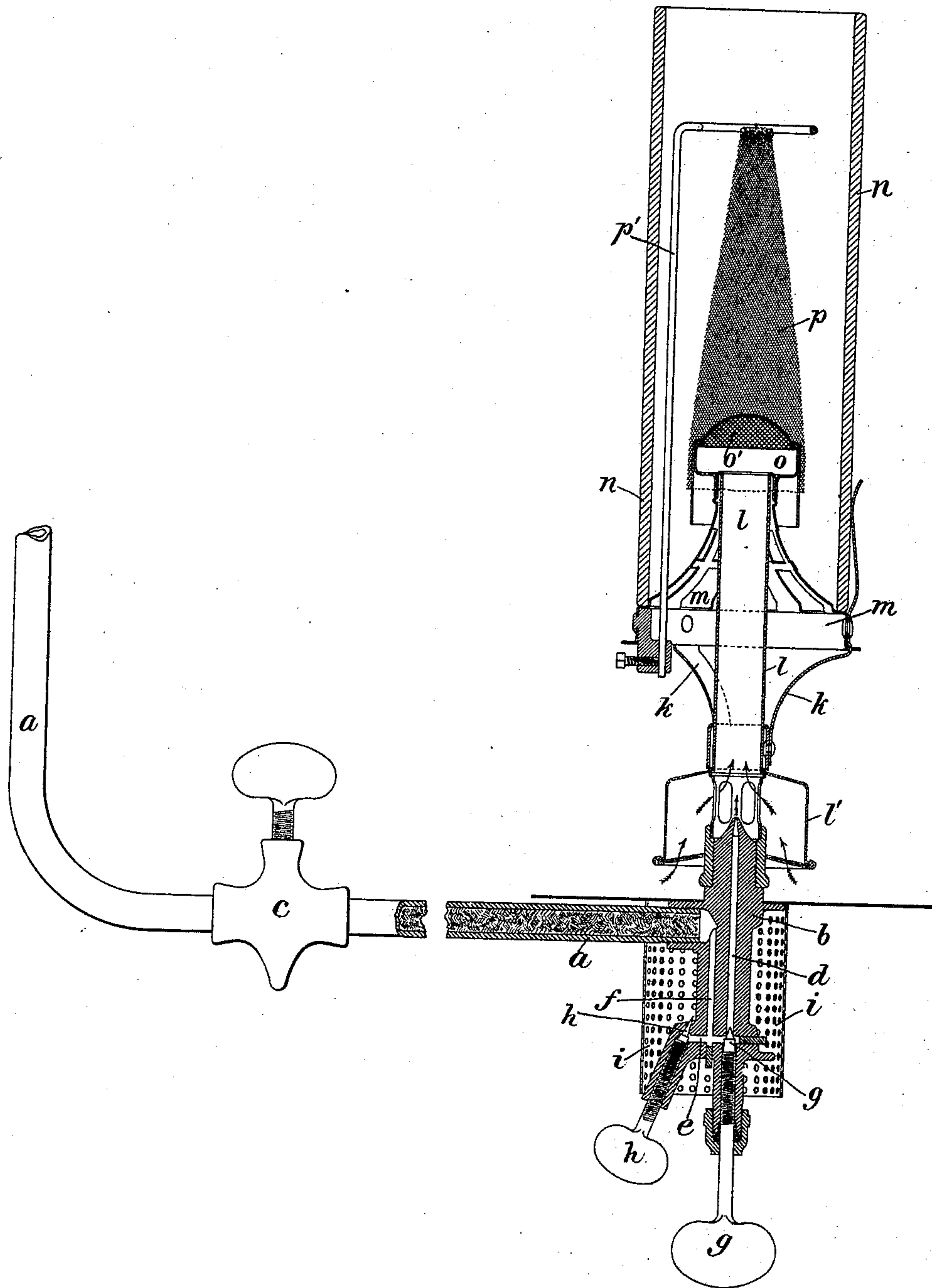


(No Model.)

H. C. CAMPBELL.
INCANDESCENT BURNER AND METHOD OF USING THE SAME.
No. 447,757.

Patented Mar. 10, 1891.



WITNESSES.

Thomas W. Baxendell
W. T. Baxwell

H. C. Campbell INVENTOR.

UNITED STATES PATENT OFFICE.

HARRY C. CAMPBELL, OF PITTSBURG, PENNSYLVANIA.

INCANDESCENT BURNER AND METHOD OF USING THE SAME.

SPECIFICATION forming part of Letters Patent No. 447,757, dated March 10, 1891.

Application filed March 5, 1889. Serial No. 301,974. (No model.)

To all whom it may concern:

Be it known that I, HARRY C. CAMPBELL, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Incandescent Burners and Methods of Using the Same, of which the following is a full, clear, and exact description.

I have discovered that by injecting hydrocarbon fluid in a heated and vaporous condition and under considerable pressure through a Bunsen burner, where it is mixed with a sufficient quantity of atmospheric air, into, through, or against a refractory body, which will become incandescent by the heat of the ignited hydrocarbon vapor, a very intense light is produced very far exceeding in candle-power any light which has been heretofore obtained by the burning of coal-gas under ordinary pressure through the intervention of a Bunsen burner and in contact with such refractory body.

To enable others skilled in the art to use my invention, I will proceed to explain the method used and the devices by which I carry the same into effect.

The drawing accompanying and forming part of this specification is a sectional elevation of a lamp embodying in its construction and operation the invention which I have made and am about to describe.

A pipe *a*, connecting with a reservoir or vessel of liquid hydrocarbon, (preferably gasoline,) enters at one side the vaporizer *b*, which forms the lower portion of the lamp or burner. The reservoir of gasoline may be elevated sufficiently above the level of the burner to cause the gasoline to flow into the vaporizer freely and with sufficient pressure to preserve a constant supply, or the reservoir may be arranged to give the requisite pressure by means of compressed air or otherwise. A cock *c* serves to open, close, or regulate the supply of liquid hydrocarbon.

Between the cock *c* and the vaporizer *b* the pipe *a* is filled with packing, (such as fibrous asbestos,) which serves the purpose of regulating the flow of the gasoline, of preventing any solid matter from entering the vaporizer, and of checking any tendency of the vapor from the vaporizer flowing back into the liquid-reservoir.

The vaporizer *b*, which is made of brass or other suitable material, is perforated vertically with a passage *d* of small diameter—say about one-sixty-fourth of an inch, more or less—the upper extremity of the passage at the top of the vaporizer being a very small hole, almost as fine as the point of a cambric needle. The lower end of the passage *d* connects by a short cross-passage *e* with another vertical passage *f*, which extends about half-way up the vaporizer, where it connects with the pipe *a*. The lower end of the vertical passage *d* is opened or closed by a conical plug or valve *g*, which has a screw-thread on its stem, which extends downward and terminates in a handle by which it is operated. The cross-passage *e* extends beyond the short vertical passage *f*, with which it connects, and terminates in a small opening in the side of the vaporizer *b*, which opening is opened or closed by a screw-plug or valve *h*.

The purpose of the opening in the side of the vaporizer and the valve *h* is to permit of the escape of a small stream of liquid or vaporized hydrocarbon at a point close to the outer surface of the vaporizer, which, being ignited, heats up the vaporizer sufficiently to vaporize all the hydrocarbon liquid which enters it from the pipe *a*. The lower portion of the vaporizer below the pipe *a* is surrounded with a perforated metallic screen *i*, which serves to prevent the small flame from the leak-hole at *h* being blown out, and also to prevent the heated vaporizer from being carelessly handled.

The operation of the apparatus as thus far described is that when the cock *c* is opened and the valve *g* closed the hydrocarbon liquid enters the pipe *f*, and being vaporized and highly heated by the heat of the vaporizer within the pipe *b* a great pressure is generated, so that the highly-heated hydrocarbon vapor is forced out through the minute orifice at the top of the pipe *b* in an upward vertical stream. Supported by the top of the pipe *b* is a light Bunsen burner, consisting of a metallic tube *l*, with perforations at its base to admit atmospheric air, and a shield or petticoat *l'*, surrounding said perforations. The tube *l* extends upward some distance, as shown in the drawing. The chimney-gallery *m* is sup-

ported by a metallic frame *l* at a point between the base and the top of the tube *l*. The chimney-gallery holds a glass chimney *n*, which surrounds the light. At the top of the tube *l* is a metallic cup *o* of larger diameter than the tube *l*, into which the tube *l* enters, and over which is placed a light dome or hemisphere *o'*, of gauze-wire, which to some extent arrests the upward passage of the stream of mixed air and hydrocarbon vapor, causing it to spread out laterally, and also serves to prevent the ignition of the gas and vapor at any point below the top of the tube *l*. Above the cup is placed a mantle *p*, preferably composed of a porous or reticulated refractory filament capable of incandescence when exposed to a high heat, which mantle may be supported by a standard *p'*. The composition and mode of manufacture of such refractory filament for incandescent lighting by coating or impregnating a combustible filament with a refractory oxide and then removing the combustible filament by heat are well known and need not to be more particularly described. I do not, however, wish to confine my improvement to the use of exactly such a mantle of refractory material, as other devices made of refractory material capable of incandescence may be used—such, for example, as a disk or disks of porous or non-porous refractory substance placed in such

position as to become highly incandescent by means of an ignited stream of mixed air and hydrocarbon fluid under pressure.

The lamp being thus constructed, the stream of mixed vapor and air passes up the tube *l* under considerable pressure, and, passing through the wire-screen dome, is ignited, and the refractory mantle over the flame soon becomes incandescent, giving a very strong light.

I claim—

1. The method of employing hydrocarbon fluids for illuminating purposes herein described—that is to say, vaporizing the hydrocarbon liquid by heat, and causing the heated vapor to pass in a fine stream under considerable pressure through an air-mixing chamber, and igniting the heated mixture of hydrocarbon fluid and air in presence of a refractory substance capable of incandescence, substantially as described.

2. The combination, in one device, as a portable incandescent lamp, of a Bunsen burner, an incandescent filamentary substance, and a self-generating and heating-gas attachment, substantially as described.

In testimony whereof I have hereunto set my hand this 2d day of March, A. D. 1889.

HARRY C. CAMPBELL.

Witnesses:

W. B. CORWIN,
JNO. K. SMITH.