

(No Model.)

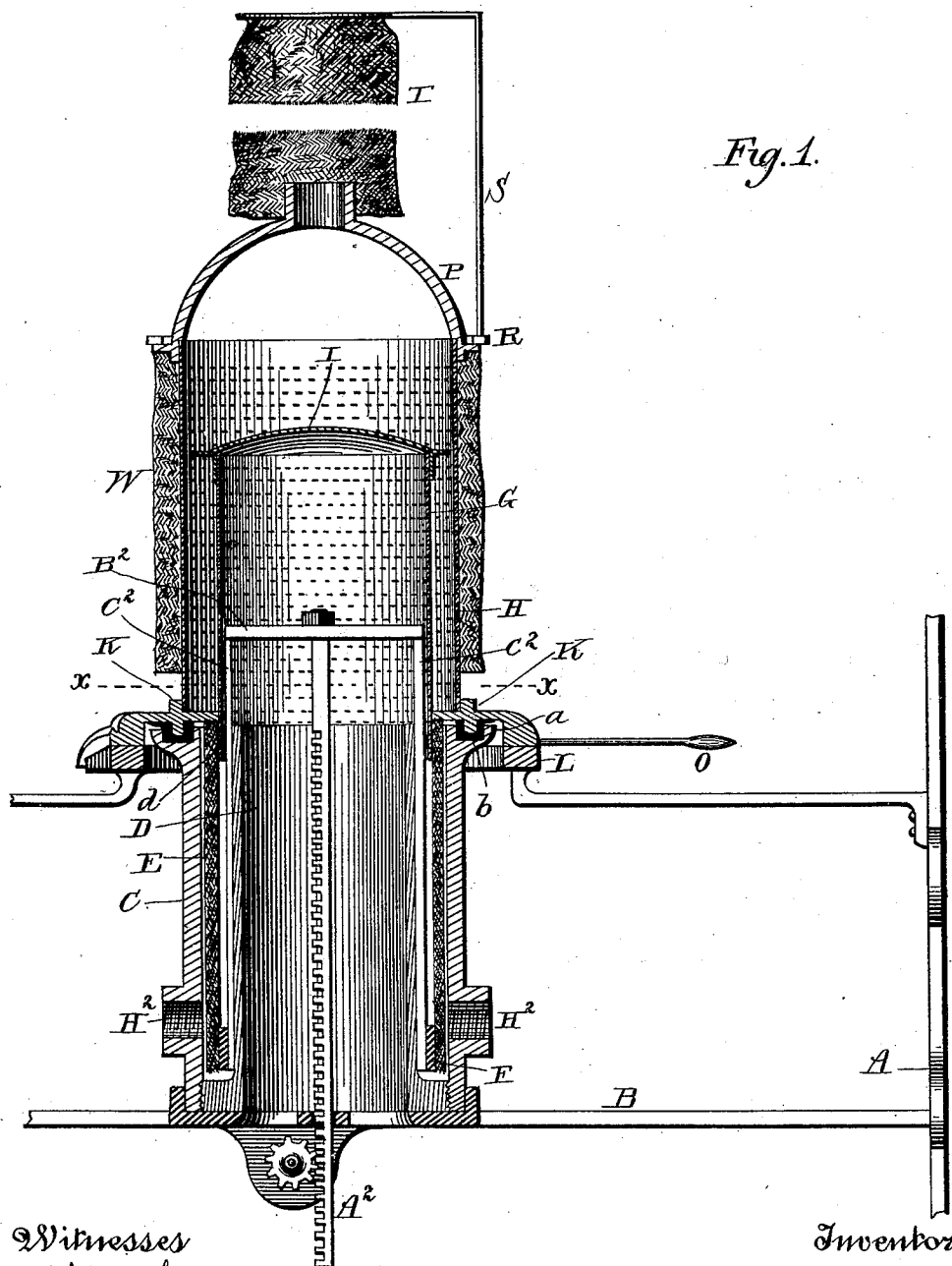
2 Sheets—Sheet 1.

F. R. FENNESSY.

OIL OR GAS BURNER.

No. 424,964.

Patented Apr. 8, 1890.



Witnesses
J. M. Hurdle
Wm. V. Capel

Inventor
Frank R. Fennessy
By *H. B. Townsend*
Atty

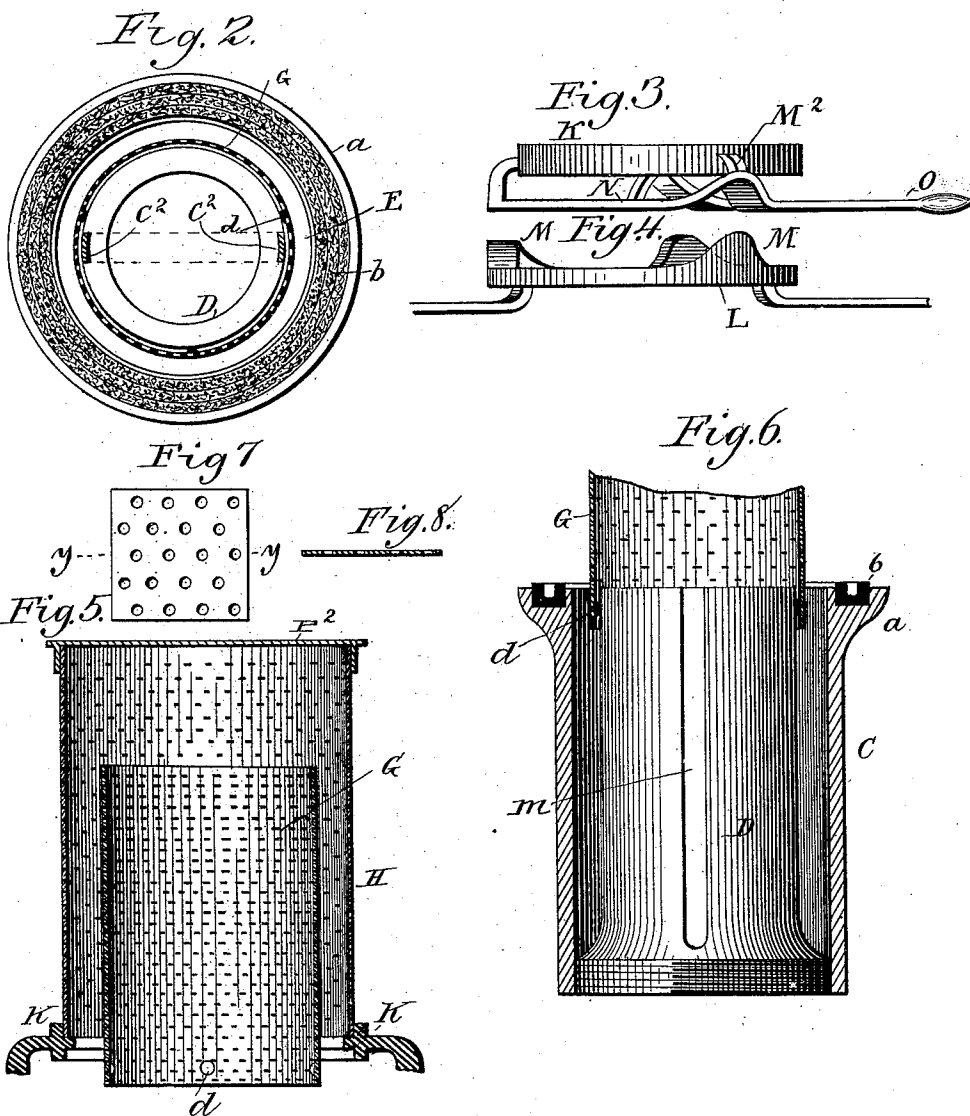
(No Model.)

2 Sheets—Sheet 2.

F. R. FENNESSY.
OIL OR GAS BURNER.

No. 424,964.

Patented Apr. 8, 1890.



Witnesses
J. A. Hurdle
H. N. Capel

Inventor
Frank R. Fennessy
By H. C. Townsend
Atty.

UNITED STATES PATENT OFFICE.

FRANK R FENNESSY, OF NEW YORK, N. Y., ASSIGNOR TO THE BLUE FLAME
MANUFACTURING COMPANY, OF NEW JERSEY.

OIL OR GAS BURNER.

SPECIFICATION forming part of Letters Patent No. 424,964, dated April 8, 1890.

Application filed December 10, 1888. Serial No. 293,230. (No model.)

To all whom it may concern:

Be it known that I, FRANK R. FENNESSY, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Oil or Gas Burners, of which the following is a specification.

My invention relates to that class of burners which have a central draft or air-supply and in which the flame from a gas-jet or the gaseous products of combustion from a burning wick are burned between the air-supplying perforated metal cylinders or chimneys concentric with the wick or jet.

The object of my invention is to provide an apparatus by means of which a perfectly blue odorless flame of great heating-power may be produced from coal-oil or from ordinary illuminating-gas for purposes of heating or for purposes of illumination when applied to a filamentary body of refractory earthy material placed in the flame so as to be rendered incandescent.

My invention is designed, further, to improve the general construction of the apparatus in the details hereinafter mentioned.

My invention consists, first, in the peculiar construction, proportions, and relations of the inner and outer perforated air cylinder or chimneys, whereby I secure the production of the odorless flame of high temperature; secondly, in the manner of supporting the outer cylinder to allow access to the wick or burner for lighting; in the manner of supporting said outer cylinder as well as the inner cylinder in order to cut off the conduction of heat from said cylinders to the oil-chamber or wick-tube; in the construction of wick-raiser, whereby the wick may be evenly raised and by devices not interfering with the general construction; in the provision of devices whereby a filamentary refractory body may be suspended over the flame or around the outer cylinder or chimney, and in certain other details of construction to be more particularly hereinafter described.

The novel features, devices, and combinations of devices whereby the desired heating or illuminating effect may be produced will

be described more particularly in connection with the accompanying drawings, forming part of this specification, and will then be more particularly defined in the claims.

I have herein shown my invention as applied to an oil-burner; but the same features may obviously be applied to a gas-burner.

In the accompanying drawings, Figure 1 is a vertical section of an apparatus embodying my invention. Fig. 2 is a horizontal section on the line X X, Fig. 1, the outer perforated cylinder having been removed. Fig. 3 is a side elevation of the supporting-ring and connected parts for the outer perforated cylinder. Fig. 4 is a side elevation of a portion of the frame or support which carries said ring. Fig. 5 is a vertical section through the two cylinders, showing a modification of the apparatus. Fig. 6 is a vertical section through the outer cylinder forming the wick-tube, the inner cylinder being shown in elevation. Fig. 7 shows a part of one of the perforated chimneys in full size. Fig. 8 is a cross-section through the same.

Referring to Fig. 1, C indicates the outside cylinder or casing which forms the outer wall of the annular chamber in which the wick and wick-holder move up and down.

D indicates an inside cylinder or casing forming the internal wall of the wick or wick-holder. In the annular space between the said cylinders is placed the wick E, properly secured to an annular wick-holder F. The wick burns at the lower end of the annular chamber formed by supply-tubes, and the gaseous products of combustion supplied by such wick are consumed in the space between the two perforated cylinders H G and at the space at the upper end of the outer cylinder. The outer perforated cylinder or chimney H is supported by a ring or washer K, which is attached to an annular plate N, as shown in Fig. 3, that is in turn supported from a ring or frame L. The ring or frame L is carried by the frame A of the stove, or by any other frame which is independent of the wick-tube or light-chamber at the bottom of the same. The object in thus supporting the outer cylinder H independently of the wick-tube is to prevent the conduction of heat from said cyl-

inder to the tube and the oil-chamber at the bottom of the same supplied with oil through openings II².

To assist in cutting off the conduction of heat from the cylinder to the wick-tube, I provide at the upper end of the outer cylinder C a ring or washer or packing b, of asbestos or other material which is a non-conductor of heat, and is preferably non-combustible, with which ring the ring K engages when the burner is in condition for use.

The packing may be in any desired form or of any desired material; but I prefer to make it fibrous or loose, so as to allow air to circulate through the same to assist in the prevention of the passage of heat across the joint.

For the purpose of raising the outer cylinder H, in order to permit access to the burner for lighting, I provide the plate N and the supporting-ring L with cam-surfaces, as indicated at M².

By means of a suitable handle O the supporting devices of the cylinder may be turned, and in so doing will obviously be raised sufficiently to permit access beneath the ring K to the upper end of the wick or burner.

The inner perforated cylinder or chimney is supported from the inner tube D by buttons or projections d, thus producing contact between the said cylinders at a number of isolated points only, and to a considerable extent cutting off the conduction of heat from the perforated cylinder to the wick-tube and oil-chamber. The upper end of the inner cylinder G is suitably closed by a plate or cover I, which causes the air passing up into said cylinder through the cylinder D to be forced outwardly into the plain chamber, consisting of the annular space between the perforated cylinders. The flame not only burns between said cylinders, but at the open mouth of the outer cylinder II, above which any article to be heated may be placed.

It is desirable, in order to produce the best effects, that the end of the inner cylinder should terminate just below the end of the outer cylinder and that the plate I should be applied to the mouth of the inner cylinder, so as to close the end of the same at a short distance below the mouth of the outer cylinder. By this construction a space is left at the upper end of the outer cylinder of substantially the same area as the mouth of the latter, in which the flames may burn, while the inner end of the inner cylinder, being closed at its mouth, the air is forced into the space between the two cylinders practically through the whole height of the annular space between them, thus supplying air for mixture with the gases to the best possible advantage. I have also ascertained that the number and size of the openings or perforations in the diaphragms or cylinders G II affect very materially the results. After a long experiment in this direction I have determined that excellent results are obtained by perforating the

cylinders with openings each of a gage or diameter of one-sixteenth of an inch, the number of such perforations or openings to the square inch being about twenty. It is obvious that an equivalent amount of air might be introduced through the perforated cylinders or diaphragms by decreasing the diameter of the perforations and correspondingly increasing their number to the square inch, or that within certain limits determined by the intimacy of the mixture of air and gas desired the diameter of each opening might be increased and the number to the square inch diminished. When therefore in my claim I specify openings of one-sixteenth of an inch diameter to the number of twenty to the square inch, I design to cover the equivalent sizes and dispositions thus mentioned. I do not, however, limit myself to the exact diameters and numbers specified which will permit a given amount of air to enter through the wall of the cylinder; but, as will be obvious, the dimensions and proportions given may be varied or departed from to some extent, so as to increase or decrease the amount of air admitted without departing from my invention.

With the apparatus arranged as described the violet or blue flame will fill the mouth of the outer cylinder and will readily heat any object placed above the same. If it be desired to contract the flame, a dome or plate P, having an opening through it, is employed.

The mouth of the outer cylinder might be entirely closed, as is obvious, by means of a plate P² (shown in Fig. 5) if it is desired to increase the flame and temperature on the outer wall of the exterior perforated cylinder II.

By the apparatus described an exceedingly intense heat may be secured, and I design employing my apparatus as a means of producing illumination. For this purpose I propose to support, either over the mouth of the cylinder H or around the same, any suitable incandescing hood—such as is employed in the Welsbach and Lungren incandescent gas-lights—and consisting, essentially, of a filamentary body of refractory material.

In the present case I have shown a hood T, similar to that of the Welsbach lamp, supported by a standard S, carried by a ring R, which rests upon a flange of the plate P. By this means the flame produced by the oil-burner, which, in the apparatus described, will be of a non-illuminating character, may be employed to produce light by heating the incandescing body T to incandescence.

A hood or incandescing body of refractory earthy material—such as indicated at W—may be also supported in the manner indicated or in any other desired way around the outer cylinder II, for the purpose of producing light. The degree of heat to which said hood W will be subjected is obviously dependent to some extent upon the degree to which the flame is caused to burn on the outside of the perforated chimney II.

In order to provide for raising the wick as

the same is consumed by a simple device and without interfering with the perforated chimneys or cylinders G H, I employ a construction, such as shown more particularly in Fig. 1, and consisting, essentially, of a vertical rod A², carrying at its upper end a cross-bar B², from which depends rods C², connected to the wick-holder F. The rods C² move in channels or slots *m*, such as indicated more clearly in Fig. 6, thus permitting the wick to lie close to the cylinder D. The rod A² is preferably made as a rack, and is operated by a pinion supported below the wick-tube and oil-chamber, consisting of the cavity at the bottom of the wick-tube.

My improved apparatus is operated in obvious manner. The wick having been lighted is allowed to burn until the parts above the same become somewhat heated and until considerable vapor is evolved, when on regulating the height of the wick by means of the apparatus described the flame may be caused to burn at the mouth of the outer chamber and in the annular space between the inner and outer chambers.

In this class of burners it is generally desirable to lower the wick to a point below that which is used with ordinary oil-stoves, the burned wick serving in my apparatus rather as a generator of the oil-vapors which are consumed in the annular chamber above the same and at the mouth of the tube H as they are mixed with the air supplied through perforations in the cylinders.

While I have described a form of wick-raiser, I do not wish to be understood as confining myself thereto; nor is it to be understood that the form of wick-raiser is necessary to the successful use of other features of the burner.

I have hereinbefore also stated that I have obtained the best results with a particular size and number of perforations and have claimed the same; but I wish it distinctly understood that I do not confine myself to the use of the same, since the other features of the burner are useful with any size of perforations and with perforated diaphragms or chimneys of any form or construction.

What I claim as my invention is—

1. The combination, in an oil or gas burner, of the exterior perforated chimney or cylinder forming the exterior wall for a flame-chamber above the burner, an interior perforated cylinder open below and terminating near the upper end of the outer cylinder, and a closing-plate at the mouth of the inner cyl-

inder and below the open end of the outer cylinder, as and for the purpose described.

2. In a central-draft oil or gas burner, perforated cylinders forming the inner and outer walls of a flame-chamber and provided with perforations of approximately one-sixteenth-inch caliber distributed twenty to the square inch or the equivalent, as described.

3. The combination, with an oil-burner and the exterior or perforated chimney or cylinder for the flame-chamber, of a supporting ring or frame for said chamber carried by a frame disconnected from the wick-tube, as and for the purpose described.

4. The combination, with the outer perforated chimney, of a supporting ring or frame disconnected from the wick-tube, and a ring or washer of asbestos or similar material on the upper end of the wick-tube between the same and the lower end of the chimney or the ring to which the same is attached.

5. The combination, with the outer perforated chimney, of a rotary annulus or ring entirely supporting said chimney and a fixed frame carrying said ring, the frame and annulus being provided with cam-surfaces, as described, whereby on rotation of the chimney the same will be raised to give access to the wick.

6. The combination, with the burner, of concentric perforated chimneys, the outer of which is closed at its upper end by a plate having a contracted mouth or opening through it, as and for the purpose described.

7. The combination, with the wick-holder F, of rods C², supporting the same at their lower ends, the cylinder B, having channels or grooves in which said rods move, the cross-head B², connecting the rods C² at their upper ends, and the rack-rod A², depending from said cross-head and passing downwardly through the cylinder for engagement by the operating-pinion.

8. The combination, with an oil-burner, of an interior perforated tube or chimney, an outer perforated tube or chimney having a contracted mouth at its upper end, and a filamentary body of refractory earthy material supported above such mouth, as and for the purpose described.

Signed at New York, in the county of New York and State of New York, this 12th day of November, A. D. 1888.

FRANK R. FENNESSY.

Witnesses:

WM. H. CAPEL,
HUGO KOELKER.