

No. 622,585

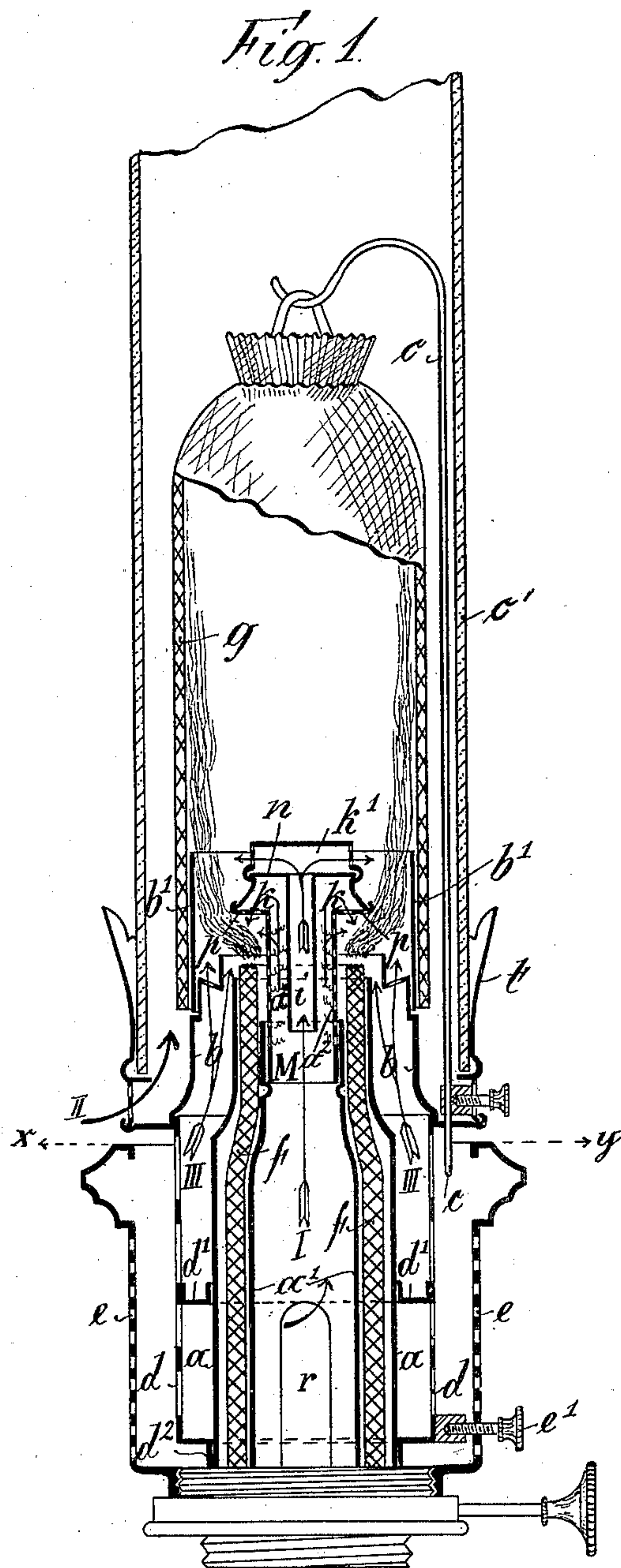
Patented Apr. 4, 1899.

R. ADAM.

INCANDESCENT BURNER FOR LIQUID FUEL.

(Application filed May 7, 1898.)

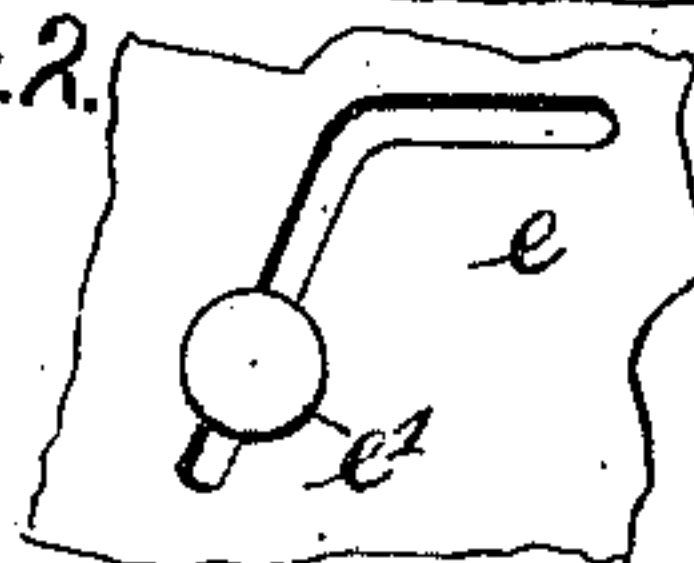
(No Model.)



Witnesses

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Fig. 2.



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UNITED STATES PATENT OFFICE.

RICHARD ADAM, OF BERLIN, GERMANY.

INCANDESCENT BURNER FOR LIQUID FUEL.

SPECIFICATION forming part of Letters Patent No. 622,585, dated April 4, 1899.

Application filed May 7, 1898. Serial No. 679,974. (No model.)

To all whom it may concern:

Be it known that I, RICHARD ADAM, a subject of the King of Prussia, German Emperor, and a resident of Berlin, Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Incandescent Burners for Liquid Fuel, of which the following is an exact specification.

This invention relates to an incandescent burner for liquid fuel, especially petroleum, the upper end of the wick of which is free of the inner wick-tube for some length and in which the vapor developed at that part of the wick is very intimately mixed with air by means of a peculiar kind of mixing device located in the reach of the flame, this mixing device serving at the same time for vaporizing the petroleum and for superheating the vapor or the mixture of vapor and air, respectively.

This burner may be used in connection with incandescent bodies of the ordinary or usual shape. In the incandescent burners for liquid fuel known to me up to now the construction is such that the flame produced necessitates the employment of a conical incandescent body. Such bodies, however, can but difficultly be manufactured, and they are therefore far more expensive.

In order to make my invention more clear, I refer to the accompanying drawings, in which—

Figure 1 is a vertical section through my improved burner. Fig. 2 is a detail showing the slot in the outer casing.

The burner is constructed as follows:

The two wick-tubes a and a' are surrounded by two perforated casings d and e , the perforations of the inner of which are far greater than those of the outer one, the size of said inner perforations being such that a match may be introduced through each of them (especially through the uppermost ones) in an oblique or nearly vertical direction and may be brought up near to the free top of the wick, so that the wick may be ignited in this way. The casing d is contracted at its lower end d^2 and is furnished in about the middle of its height with an annular partition-wall d' , the arrangement being such that the casing d may be displaced along the outer wick-tube a in a vertical direction and may be

guided during that time by the parts d' and d^2 . The object of the displacability of the casing d is to bring the uppermost series of the large apertures of this casing to about the height of the top of the wick, so that the latter may be more easily ignited, the position of height of the casing d being then such that the partition-wall d' is located in the plane indicated by the line $x y$. The casing d is furnished at its lower end with a screw e' , the threaded portion of which passes through an oblique or inclined slot provided in the respective part of the outermost casing e . The upper end of said slot extends for a short way in a horizontal direction, so that the casing d may be secured in its upper position after it has been raised and at the same time slightly turned by means of the screw e' .

The two wick-tubes are contracted at their upper ends, and the casing d is also provided with a contracted cylinder b , surrounding the contracted part of the outer wick-tube and forming, together with the same, an annular channel through which air may pass to the upper end of the wick or to the flame. The upper end of the cylinder b is constructed of two parts of different diameter, which are connected with each other by a perforated ring. The air flowing upward in the direction indicated by the arrows III divides in two concentric currents, one of which passes through the annular space between the upper edge of the outer wick-tube and the neighboring part of the cylinder b , whereas the other current passes through the perforations in the ring aforementioned.

The object of the partition-wall d' between the casing d and the wick-tube a is not only to guide the former along the latter, but also to divide the air passing into the burner-casing e into two parts, one part forming the current indicated by the arrow III and the other part forming the current indicated by the arrow I, this part passing through the longish channel r of the two wick-tubes into the inner wick-tube a' . The partition-wall d' is located immediately above this channel, and by this means the current or currents III has or have the same strength around the whole circumference of the upper part of the wick-tube a . Consequently, also, the flame has a

uniform height and assumes a circular configuration, so that the cylindrical incandescence body g is uniformly heated at each portion of its mantle. The lower part of the incandescent body is secured in position by a cylinder b' , supported by the cylinder b , and the whole incandescent body is supported itself by a wire c , secured, by means of a screw, to the carrier t of the chimney c' . If the latter, together with the incandescent body, is to be removed from the burner-casing and from the wick-tubes, so as to afford an access to the wick for the purpose of cleaning the upper end of the latter, the screw e' is removed from the casing d , when the latter may be completely drawn off the wick-tube a .

An important point of my invention resides in the construction and arrangement of a peculiar kind of hood M , supported by or secured to the contracted upper end of the inner wick-tube a' , the hood M extending up to the height of the cylinder b' and consists of two concentric tubes a^2 and i , the outer of which, a^2 , is provided with a large number of small openings, some of which are located opposite to the free portion of the wick f . The tube a^2 supports at its upper end a perforated disk p , and the latter supports a casing $k k'$, divided into two superposed chambers by a horizontal wall n . The tube i is held by said wall and communicates with the upper chamber k' , whereas the lower chamber k communicates with the tube a^2 . The current of air I divides thus also in two concentric parts, the inner part flowing through the tube i into the upper chamber k' and leaving the latter through the lateral openings of the same, whereas the other part passes into the tube a^2 and leaves the latter through the uppermost openings of the same, as well as through the openings of the disk p .

When the upper end of the wick has been ignited, the hood M , especially the upper part of the same, is intensely heated by the flame, and the heat is conducted in a downward direction along the tube a^2 to that portion of the latter which is located opposite to the free part of the wick. In consequence of this the petroleum is turned into vapor, and the vapor is sucked through the lower openings of the tube a^2 into this tube, where it intimately mixes with part of the current of air I . This heated mixture then leaves the hood through the upper openings of the casing a^2 and through the openings of the disk p , and in doing so it meets with that part of the current of air III which passes upward through the annular space between the upper edge of the wick-tube a and the neighboring most contracted part of the cylinder or cap b . The draft produced by the chimney c' is so strong that the flame, which up to this time issued directly from the upper end of the wick, is torn off the latter, and at the same time this flame, which up to this time was a luminous one, is turned into a non-luminous one.

From this moment the hood M is still more intensely heated and the generation of vapor out of the petroleum proceeds with increased strength, so that there finally results a flame of very high temperature, which causes the incandescent body to glow with an extreme brilliancy all over the whole extent of its mantle. This action is continuously maintained by the large number of small currents of air which pass through the lateral openings of the upper chamber k' , as by these currents the non-luminous flame is extended and directly blown against the incandescence body.

The currents of air indicated by the arrow II pass in known manner into the chimney-carrier and between the chimney and the incandescent body, so that there is obtained a practically complete combustion of the vapor developed out of the petroleum in the manner aforescribed.

Having thus fully described the nature of my invention, what I desire to secure by Letters Patent of the United States is—

1. In an incandescent burner for the use of liquid fuel, the combination with the two wick-tubes $a a'$, the inner of which is shorter than the outer one, of a hood M supported by the inner wick-tube, a cylinder b surrounding the upper part of the outer wick-tube, a perforated casing d supporting said cylinder, an annular partition-wall d' secured to said casing, a contracted part d^2 of the latter, an outer burner-casing e having an inclined slot with a horizontal upper end, a screw e' passing freely through said slot and being secured to the casing d , and means for supporting the incandescent body and the chimney, substantially as described.

2. In an incandescent burner for the use of liquid fuel, the combination with the two wick-tubes $a a'$, being both contracted at their upper parts, of a casing d with large perforations surrounding the wick-tubes, a contracted lower part d^2 of said casing and an annular partition-wall d' secured to the said casing, the arrangement being such that the latter may be vertically displaced along the wick-tube a ; a contracted cylinder b supported by the casing d , another cylinder b' supported by the cylinder b ; a hood M supported by the contracted part of the inner wick-tube and extending up to the height of the cylinder b' ; said hood forming two chambers $k k'$, a partition-wall n separating said chambers from each other a perforated pipe a^2 forming the lower part of the hood and a pipe i reaching down from the chamber k' into said pipe p^2 , substantially as described.

3. In an incandescent burner for the use of liquid fuel, the combination with the outer wick-tube a of a shorter inner wick-tube a' , a perforated pipe a^2 extending upward from the inner wick-tube, a perforated disk p secured to the upper end of said pipe a^2 , a chamber k located above said disk and communicating with the pipe a^2 , a chamber k' located

above the chamber *k* and separated from the same by a partition-wall *n*, a pipe *i* extending down from said wall into the pipe *a*², and lateral openings provided in the chamber *k'*;
5 a casing *d* surrounding the wick-tube *a* and a casing *e* surrounding the casing *d*, a screw *e'* secured to the latter and passing through an inclined slot of the casing *e*, a chimney-carrier secured to the casing *d*, an incandescent body located inside the chimney and

means for supporting the incandescent body, substantially for the purpose as described.

In witness whereof I have signed this specification, in the presence of two subscribing witnesses, this 7th day of April, in the year 15 1898.

RICHARD ADAM.

Witnesses:

HENRY HASPER,
C. H. DAY.