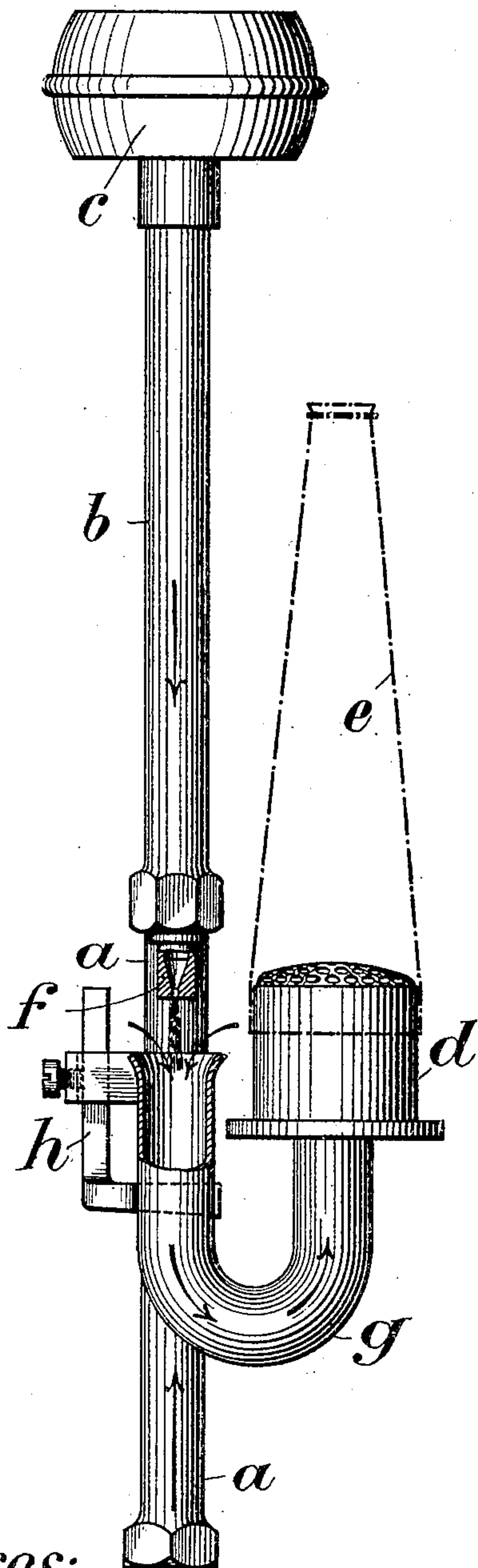


No. 824,268.

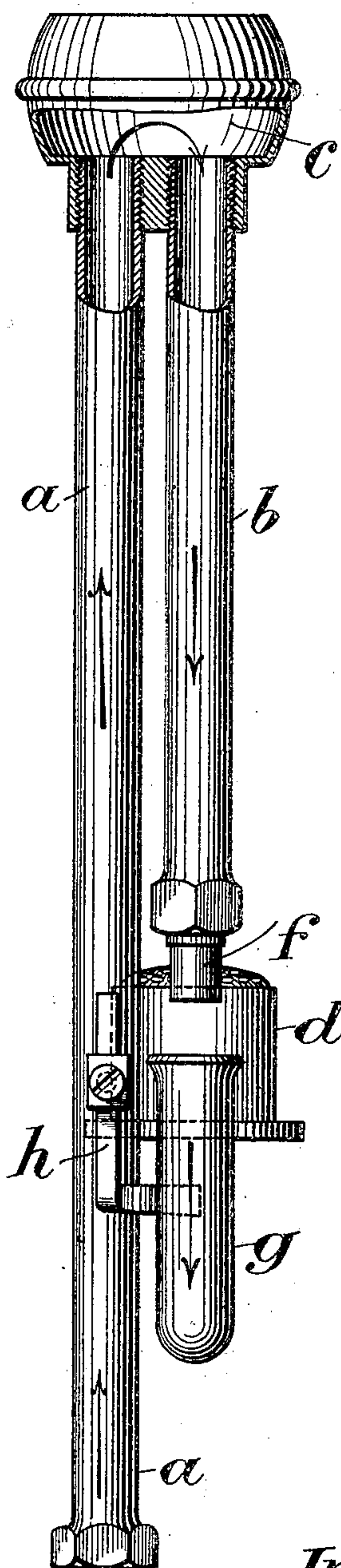
PATENTED JUNE 26, 1906.

P. ULMANN.  
BUNSEN BURNER FOR LIQUID HYDROCARBONS.  
APPLICATION FILED APR. 27, 1905.

*Fig.1.*



*Fig.2*



*Witnesses:*

*Harry L. Amer.*  
*W. Kommer*

*Inventor:*

*Philipp Ulmann.*  
*by Henry Orth* atty.



# UNITED STATES PATENT OFFICE.

PHILIPP ULMANN, OF FRANKFORT-ON-THE-MAIN, GERMANY, ASSIGNOR  
TO THE FIRM OF KINLEY-LICHT & APPARATEBAU GESELLSCHAFT,  
M.B.H., OF FRANKFORT-ON-THE-MAIN, GERMANY.

## BUNSEN BURNER FOR LIQUID HYDROCARBONS.

No. 824,268.

Specification of Letters Patent.

Patented June 26, 1906.

Application filed April 27, 1905. Serial No. 257,632.

*To all whom it may concern:*

Be it known that I, PHILIPP ULMANN, a citizen of the Republic of Switzerland, residing at Frankfort-on-the-Main, Germany, have invented new and useful Improvements in Bunsen Burners for Liquid Hydrocarbons, of which the following is a specification.

In Bunsen burners for liquid hydrocarbons, more particularly heavy hydrocarbons, the fuel is converted into a vaporous condition, as is well known, by being heated and then mixed with fresh air. This is done by vapor being driven through a nozzle which connects with the open air in order to enable it to draw in fresh air. Now it has been found in practice that good results cannot be obtained with such constructions, as in spite of the heating-tube for the liquid hydrocarbon being prolonged and placed within reach of the burner-flame condensation of vapor takes place, which acts unfavorably on the nozzle, the flame, and the incandescent mantle. Condensed liquid hydrocarbon is deposited in the nozzle, and liquid or partly-saturated vapor reaches the flame. As experiments have shown, these drawbacks are to be ascribed to heat being constantly withdrawn from the nozzle by the vapor flowing through it, owing to said nozzle being in contact with the open air and being always surrounded by free air, so that condensation must take place unless, as in the present invention, care be taken that the nozzle be constantly heated. These drawbacks are removed in the present invention by the nozzle being constantly and directly heated from the flame of the burner, whereby the nozzle, because it is hotter than the vapor flowing through it, robs the latter of no heat, so that no condensation takes place therein, and when the vapor already in the heating-tube tends to be condensed it is again dried by the heat of the nozzle.

The invention is shown as an example in the accompanying drawings.

Figure 1 is a front view, and Fig. 2 a side view and partial section, of a Bunsen burner according to the present invention.

The Bunsen burner shown has two vertical tubes *a* *b* of unequal length running parallel to one another, the upper ends of which connect with a hollow head *c*. Near these tubes there is a burner-head *d*, over which a

mantle *e* is arranged in the ordinary way, the tubes *a* and *b* standing within reach of the flame of this burner. At the level of the burner-head the shorter tube *b* connects below with and has tightly fitted in it a downwardly-directed discharge-nozzle *f*, which thus also stands within reach of the flame and which stands directly opposite the mouth of a mixing-tube *g*, the other mouth of which is connected with the burner-head *d*. The lower end of the superheating-tube *b* is made thicker, so that after it once becomes thoroughly heated it will not be as quickly and easily cooled down by the cooler vapors passing through it as if it were thin, and, as shown in the drawings, the outer periphery is hexagonal in form, so that a tool can grip the end when the nozzle *f* is inserted. This mixing-tube is provided with an arm *h*, by means of which it is adjustably mounted on the tube *a*, so that the mouth of the mixing-tube facing the nozzle may be approached to the nozzle and removed therefrom for the purpose of increasing or diminishing the supply of air to the mixing-tube.

The working of the Bunsen burner hereinbefore described is as follows: The liquid hydrocarbon passes from the pipe *a*, where it is partially vaporized, into the hollow head *c*, where, in consequence of the intense heat to which the latter is subjected, owing to its position over the flame, the partially-vaporized fuel is thoroughly dried. The vapor thus produced in this head passes down into the pipe *b*, in which, in consequence of it being closer to the flame than the pipe *a*, the vapor therein is superheated to a high degree. In this condition the vapor flows through an outlet-nozzle in the lower end of the pipe *b* into the mixing-pipe, carrying air with it, with which it is then mixed in order to flow out of the burner-head in a mixed condition, and thus burn as blue or non-luminous flame. The vapor-outlet nozzle lies thus close to the flame and is thereby so heated that any formation of condensed hydrocarbon tending to stop up the nozzle is entirely impossible.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is—

A hydrocarbon-burner comprising a

burner-head, a vaporizing-tube, a superheat-  
ing-tube having a downwardly-projecting  
nozzle, the body of which is close to and  
slightly above the plane of the burner-head  
5 and lower edge of the flame, the lower end of  
said nozzle entirely free and the mouth there-  
of below said lower edge of the flame, and a  
flaring-mouthed mixing-tube independent of  
and beneath the nozzle communicating with

the burner-head, whereby the collection of 10  
condensates in the nozzle is avoided.

In testimony whereof I have signed my  
name to this specification in the presence of  
two subscribing witnesses.

PHILIPP ULMANN

Witnesses:

JEAN GRUND,  
CARL GRUND.